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14. ABSTRACT

This paper examines a model for thinking about coercion that explains airpower?s role in achieving national objectives. Coercion is the use of power to achieve objectives, not by imposing the desired conditions upon an adversary, but rather by convincing the adversary to accept and implement those

conditions as a negotiated solution to a confrontation. The foundation of coercion is the adversary?s decisionmaking process, and most theories of coercion rely on a rational model that weighs costs, benefits, and expectations for success. Prospect theory provides a broad and intuitively appealing perspective on coercion, one that demands we consider the alternatives the adversary faces when we ask him to give up a course of action. Additionally, it incorporates the concept of risk, and thereby attempts to account for the variety of risk-taking and conservative behavior we see in conflicts throughout history. The central proposition is that how decisionmakers frame problems guides the decisions they make. A prospect theory model of airpower coercion is developed here that defines framing, decision parameters, alternatives of continuing action or acquiescing to demands, and airpower linkages. Six historical cases are examined to explore the value of the model, and they illustrate some distinct insights the model provides. Airpower strategies of punishment, denial, decapitation and airlift are shown to have multiple effects which influence many areas of the decisionmaking process. Strategists and organizations can derive a number of recommended tools and lessons from an examination of the model.

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THE PSYCHOLOGY OF COERCION:

MERGING AIRPOWER AND PROSPECT THEORY

By

JON A. KIMMINAU, MAJOR, USAF

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About The Author

Major Jon A. Kimminau is a 1982 graduate of the United States Air Force Academy (USAFA). After receiving a Master's in Public Policy from the John F. Kennedy School of Government, Harvard University, in 1984, he attended basic intelligence officer and signals intelligence officer training enroute to becoming a flight commander with the 6912th Electronic Security Group, Berlin, Germany. From 1987 to 1990, he served as an assistant director of operations with the European Electronic Security Division, Ramstein AB, Germany, and was a distinguished graduate of Squadron Officer School at Maxwell AFB in December 1987. Changing theaters, he became the Director of Operations for the 6990th Electronic Security Squadron, Kadena AB, Okinawa, Japan, operating the RC-135 reconnaissance platform for theater and national requirements from 1990 to 1993. In June of 1993, Major Kimminau became the airborne reconnaissance programs manager at the Cryptologic Support Center, Kelly AFB, Texas, moving in 1994 to HQ Air Intelligence Agency as a lead acquisition staff officer for reconnaissance programs with the Directorate of Plans and Programs. From June 1995 to June 1996 he served as the Executive Officer to the Commander, Air Intelligence Agency. He was a distinguished graduate from Air Command and Staff College, Maxwell AFB, in June 1997, and graduated from the School of Advanced Airpower Studies in June 1998. He is currently attending Ohio State University in pursuit of a Ph.D. in Political Science.

Contents

Page

Illustrations

Page

Tables

Page

Preface

This thesis serves a dual purpose: it scratches an itch in a particular academic area, and it tries to expand thinking on a topic of immense practical importance to the Air Force. The itch concerns prospect theory: from my first reading of the original, though technically oriented, article that proposed the theory, I became fascinated with the implications of this particular bounded rationality model of decisionmaking. Coercion provided me an appropriate field for applying many of the implications of the theory. I found in developing my ideas that this is more than just a convenient exploration to meet a thesis requirement—I believe the merger of these two areas produces a usable and consistent air power concept. I hope the reader will agree.

While all the faults of this paper are certainly mine, I owe a great deal to at least four of the faculty of the School of Advanced Airpower Studies. Lt Col Clayton Chun provided the initial inspiration with a side reading in his excellent Primer for Strategists course, while Dr Hal Winton encouraged and challenged my intense interest in theories. Maj Mark Conversino served as my research advisor, and inspired me with words of wisdom whenever he "turned his coffee cup." Finally, Professor Karl Mueller acted as a mentor in the field of political science, in addition to serving as my research reader. To all, and the remaining members of the faculty, I owe heartfelt thanks for a hard but well-spent year.

Most of all, I owe thanks to God for all his blessings, the top of the heap being my wife and partner Trish, and my kids, Bekah, Erin and Riley.

Abstract

This paper examines a model for thinking about coercion that explains airpower's role in achieving national objectives. Coercion is the use of power to achieve objectives, not by imposing the desired conditions upon an adversary, but rather by convincing the adversary to accept and implement those conditions as a negotiated solution to a confrontation. The foundation of coercion is the adversary's decisionmaking process, and most theories of coercion rely on a rational model that weighs costs, benefits, and expectations for success.

Prospect theory provides a broad and intuitively appealing perspective on coercion, one that demands we consider the alternatives the adversary faces when we ask him to give up a course of action. Additionally, it incorporates the concept of risk, and thereby attempts to account for the variety of risk-taking and conservative behavior we see in conflicts throughout history. The central proposition is that how decisionmakers frame problems guides the decisions they make. A prospect theory model of airpower coercion is developed here that defines framing, decision parameters, alternatives of continuing action or acquiescing to demands, and airpower linkages. Six historical cases are examined to explore the value of the model, and they illustrate some distinct insights the model provides. Airpower strategies of punishment, denial, decapitation and airlift are shown to have multiple effects which influence many areas of the decisionmaking process. Strategists and organizations can derive a number of recommended tools and lessons from an examination of the model.

Chapter 1

Introduction

> *The urge to do something quick, decisive, and 'surgical' in Bosnia, and most recently in Iraq, has parallels to our earlier experience in Vietnam. In each conflict the same craving for action led to similar attempts to find simple solutions to complex problems. Bomb to signal our will. Bomb to punish our enemies. Bomb to encourage our allies. Bomb even to silence domestic critics.*
>
> — Joseph Cerami, "Presidential Decisionmaking and Vietnam"

How does coercion work? When nations face the problem of getting adversaries to change their behavior, and must resort to force or some other unpleasant means, the answer to that question is vital. The common understanding is that coercion is a process of manipulating costs and benefits for a rational adversary. Nations assume that adversaries will then make choices based upon cost-benefit analysis, or at least will behave as if they were making that kind of judgement. Thought, energy and action are focused on connecting the means of force to costs, and diplomacy to benefits; meanwhile, airpower is offered by political and military pundits as an efficient means of target destruction or cost manipulation. This paper proposes that coercion is the manipulation of the adversary's decisionmaking process, a process better explained by something called prospect theory than by a simple rational model; and a prospect theory model of coercion better represents airpower's role in achieving national objectives.

Understanding coercion as manipulation of the adversary's decisionmaking process is the first step. The assumption that nations will behave rationally—that they will objectively weigh costs and benefits against expected outcomes—is suspect. *Bounded rationality* is a term coined to describe a number of anomalies that have been observed in research on decisionmaking.[1] Bounded rationality holds that people often make choices that do not correspond to the highest expected payoff, and therefore the propositions that form the traditional rational actor model are insufficient or incorrect. If coercion theory as it exists today is fundamentally based on rationality, and rationality assumptions do not reflect how decisions are really made, a better model of decisionmaking is needed.

Prospect theory is a bounded rationality theory of decision under risk. Daniel Kahneman and Amos Tversky developed a set of axioms in 1979 to modify the standard rational model of decisionmaking and explain systematic violations they observed in a series of social science research studies.[2] The theory proposes that people *frame* decisions depending on their perception of their situation, and then evaluate alternatives differently depending upon the frame. For example, if decisionmakers feel that they have lost something—their current status is undesirable—they are said to be in the *domain of losses*, and their behavior when faced with choice will be risk acceptant, as they attempt to regain something. In *Every War Must End*, Fred Ikle points out that in February 1918,

> The Germans objected to the Austrian suggestion that they shift their war objectives and agree that "their two countries were obliged to fight for the pre-war possessions of Germany. But Ludendorff granted this concession only after vehement opposition: 'If Germany makes peace without profit,

[1] Herbert A. Simon, "Rational Choice and the Structure of the Environment," *Psychological Review* 63 (1956): 129-138.
[2] Daniel Kahneman and Amos Tversky, "Prospect Theory: An analysis of decision under risk," *Econometrica* 47:2 (March 1979): 263.

> then Germany has lost the war.' What curious inability to distinguish between loss of some territories and loss of the nation!"[3]

In general, the assumption that imposing punishment may lead to a desire for negotiation can fail with adversaries who may seek even more risky ways of escaping losses.

If prospect theory provides a better explanation of an adversary's decision process than the rational actor model, the next question is how airpower fits in. Most coercion theories today focus on airpower as targeting: destroying or disrupting things possessed by the adversary.[4] Yet, a fuller conception of coercion holds that airpower can either add positive influences (rewarding the adversary with airlift) or other types of negative influences (restricting flight over territories, reinforcing allies who oppose the adversary, or acquiring and publicly releasing information on what the adversary is doing). Understanding airpower's effects on an adversary requires first understanding his decisionmaking process; therefore, by developing prospect theory to explain that process we might more accurately trace air strategies to political outcomes.

To see whether prospect theory can improve our understanding of coercion, some history should be reviewed with a critical eye. Prospect theory lends itself to looking at three types of cases. The first two are situations where adversaries frame themselves in either the domain of gains or the domain of losses. As one analyst of prospect theory offers, "crisis bargaining behavior is more destabilizing than rational choice theories

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[3] Fred Ikle, *Every War Must End* (New York: Columbia University Press, 1971), p. 82. Robert Jervis linked this anecdote with prospect theory in "Political Implications of Loss Aversion," in Barbara Farnham, ed., *Avoiding Losses/Taking Risks* (Ann Arbor: University of Michigan Press, 1994), pp. 26-27.

[4] See Phillip S. Meilinger, ed., *Ten Propositions Regarding Airpower* (Washington, D.C.: Air Force History and Museums Program, 1995), p. 20. Specifically, "Air Power is

predict because political leaders are less likely to make concessions and more likely to gamble and risk large losses in the hope of eliminating smaller losses altogether."[5] A third type of case arises from prospect theory's propositions about how uncertainty is handled; in cases where the probabilities of outcomes or payoffs are extremely low, decisionmakers may begin focusing on the payoffs themselves and disregard the likelihood that one outcome is more probable than the other. This may give insight into why nations continue fighting past the point where they have any reasonable chances for success.

The goal of this study is to merge prospect theory and airpower. Chapter 2 examines how coercion is usually based on rationality assumptions. Chapter 3 explains prospect theory, while Chapter 4 extends prospect theory into a coercion model and proposes the effects that airpower can have within that model. Chapter 5 surveys a number of military coercion events, organized by prospect theory "cases," and compares the explanatory power of prospect theory to rational theories of expected utility. Finally, Chapter 6 derives conclusions from the case studies and explores the implications of using prospect theory to understand coercion.

Prospect theory is still a developing approach in the study of international relations. This paper does not try to explore all of the propositions prospect theory advances, nor does it delve deeply into the social science research exploring the validity of its axioms. It does attempt to represent prospect theory in a manner understandable to those who are

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targeting, targeting is intelligence, and intelligence is analyzing the effects of air operations."

[5] Jack S. Levy, "Loss Aversion, Framing and Bargaining," *International Political Science Review* 17:2 (April 1996): 180.

unfamiliar with the subject. The object is to provide some tools for decisionmakers and strategists to think about coercion more clearly, and to act with better results.

Chapter 2

Coercion and Rationality

> *The power to hurt is nothing new in warfare, but for the United States modern technology has drastically enhanced the strategic importance of pure, unconstructive, unacquisitive pain and damage, whether used against us or in our own defense. This in turn enhances the importance of war and threats of war as techniques of influence, not of destruction; of coercion and deterrence, not of conquest and defense; of bargaining and intimidation.*
>
> —Thomas Schelling, *Arms and Influence*

Coercion focuses on the mind rather than the hands—the foremost concern is what the adversary *chooses to do* rather than *what it is capable of doing*. When nations resort to force to pursue their interests, they adopt one of two perspectives on military strategy. The first perspective sees victory in defeating the enemy's military capabilities, making them incapable of resistance, and imposing surrender terms. The second perspective sees victory as a bargain achieved through threatened violence and negotiated outcomes—the adversary acquiesces after facing controlled pressure.[1] The latter perspective is associated with **coercion**, and the distinguishing characteristic of coercion is not a preference for the economical use of military force, as is often supposed. Coercion is

[1] The first category is defined classically by Carl von Clausewitz and Henri Jomini, and in airpower terms by John Slessor; the second category is defined by B. H. Liddell Hart and Julian Corbett, and in airpower terms by Giulio Douhet, Billy Mitchell and a host of other airpower advocates. Theoretically, Thomas Schelling distinguishes these as an older "victory" school and a newer "diplomacy of violence" school; see Schelling, *Arms and Influence* (New Haven: Yale University Press, 1966), preface and p. 16.

different from defeating an enemy because it focuses on adversary behavior and decisionmaking.

Coercive strategies concentrate on influencing the enemy's choices and decisions. The adversary's *estimate* of the future is the focus of action; as Thomas Schelling states,

> Coercion depends more on the threat of what is yet to come than on damage already done. The pace of diplomacy, not the pace of battle, would govern the action…the military action must communicate a continued threat.[2]

Alexander George describes the same logic of coercion as emphasizing "the use of threats of punishment if the adversary does not comply with what is demanded. If force is used … it takes the form of an exemplary or symbolic use of limited military action to help persuade the opponent to back down."[3] Robert Pape is the most succinct: "The problem in coercion is to persuade the target state that acceding to the coercer's demands will be better than resisting them."[4]

Coercion thus has a dual nature: it depends on communicating a threat and, implicitly or explicitly, offering a bargain or a way out. The threat is a possible future cost for the adversary, and it can involve the application of force against adversary military capabilities or other assets, or both. The bargain is that the adversary can avoid suffering the threatened harm, while the coercer minimizes the costs it must pay to achieve its goals. As George states, it "is an attractive strategy because it offers the defender a chance to achieve reasonable objectives in a crisis with less cost, with much less—if any—bloodshed, with fewer political and psychological costs, and often with

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[2] Schelling, p. 172.
[3] Alexander George, "Coercive Diplomacy," in Alexander George and William Simons, eds., *The Limits of Coercive Diplomacy* 2nd ed. (Boulder: Westview Press, 1994), p. 10.
[4] Robert Pape, *Bombing To Win* (Ithaca: Cornell University Press, 1996), p. 15.

less risk of unwanted escalation…."[5]Coercion's "threat and bargain" dynamic differs sharply from strategies of brute force which focus on destroying or eliminating enemy capabilities.

The fact that nations do try to coerce opponents means that first, they believe coercing offers advantages in efficiency, and second, they believe they adequately understand the adversary's decisionmaking process. It is a "beguiling strategy" because the process of communicating and bargaining is fraught with opportunities for mistakes and misperceptions.[6] If those mistakes and misperceptions are severe enough, the coercing state may find itself prolonging conflict and suffering costs that exceed the original goal. The underlying assumption of any coercing state is that it believes its actions will be understood in particular ways and that, consequently, favorable decisions will be made by the adversary state. Any coercing state therefore has some **mechanism** in mind that links its actions to the adversary's choices and behavior.

The Mechanism of Military Coercion

Because coercion depends upon manipulating the costs and benefits an adversary faces,[7] it involves implicit or explicit assumptions about how the adversary will view the situation presented him. One example of these assumptions is described by Clausewitz:

> If the enemy is to be coerced you must put him in a situation that is even more unpleasant than the sacrifice you call on him to make. The hardships of that situation must not of course be merely transient—at least not in appearance. Otherwise the enemy would not give in but would wait for things to improve. Any change that might be brought about by continuing

[5] George, p. 9.
[6] See George, p. 9, and Pape, pp. 13-15.
[7] Pape, pp. 4 and 12.

> hostilities must then, at least in theory, be of a kind to bring the enemy still greater disadvantages.[8]

A more general characterization of this process is that *coercive strategies affect adversary choices*. On the one hand, the adversary can continue hostilities and suffer the threatened costs. On the other hand, the adversary could accede to demands and suffer the consequences of the coercer's terms of defeat. Coercion is successful when adversaries accede to demands before the threat is executed—i.e., they agree that acquiescence is a bargain.

Giulio Douhet's airpower ideas fit this generalization of coercion. His original theory for the use of airpower proposes that nations should first gain command of the air (through bombing attacks) and then exploit that command in delivering destruction upon the enemy's homeland.[9] This theory leads to two different methods of coercion. The first proposes that the adversary will suffer such destruction and breakdown of social organization when command of the air is exploited that the people will rise up against their government and end the war.[10] Since the threat involves utter destruction by bombing, it may seem to be an extreme version of coercion. However, Douhet wrote specifically from the experiences of World War I and believed a long war of attrition to be far more severe than a short, though intense, bombing campaign. Thus, the bargain of this method is that both sides avoid the long and destructive stalemate.

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[8] Carl von Clausewitz, *On War*, ed. and trans. by Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), p. 77.

[9] For a general description of the theory, see Col. Phillip S. Meilinger, ed., *The Paths of Heaven* (Maxwell AFB, AL: Air University Press, 1997), pp. 1-40, or Brodie, pp. 85-88. Giulio Douhet's original proposition can be found in *Command of the Air*, trans. by Dino Ferrari and edited by Richard Kohn and Joseph Harahan (Washington, D.C.: Office of Air Force History, 1983), pp. 24 and 98.

[10] Douhet, p. 58.

Douhet offers a second and perhaps more elegant method of coercion. As he developed his ideas further, he proposed that governments and peoples would understand the *inherent* threat of bombing by an adversary who possesses command of the air above them. The unexecuted threat alone might suffice to cause surrender by the enemy, thereby saving both sides the costs of a long and brutal attrition campaign.[11] The airpower coercion mechanism in this case depends on: a) destroying the adversary's own airpower, i.e., their ability to control the air; b) possessing the destructive capacity to bomb the adversary after gaining command of the air; and c) having the adversary appreciate the inherent threat and choose a less costly alternative in submitting to defeat.

The key to coercion is contained in the last requirement: understanding how the adversary will appreciate the threat and choose the preferred alternative. Robert Pape highlights this in stating that "determining the strategic effectiveness of a coercive air campaign requires identifying the causal mechanism by which destruction of a specific target set would change the enemy's political calculations."[12] For Pape, this devolves into analyzing the effects of certain types of target destruction on a rational enemy. But the larger insight is the importance of understanding how the adversary makes decisions.

Rationality and Coercion

Most theories of coercion rest upon the belief that the adversary will make rational decisions; i.e., they will understand and weigh costs and benefits of alternatives, and choose the value-maximizing alternative.[13] Using rational models of decisionmaking is

[11] Douhet, pp. 193, 203.
[12] Robert Pape, "The Limits of Precision-guided Airpower," *Security Studies* 7:2 (Winter 97/98): 96.
[13] Jeffrey Taliaferro, "Quagmires in the Periphery," *Working Papers* No. 97-6 (Harvard University: The Weatherhead Center for International Affairs, June 1997), p. 1.

attractive because is it intuitively compelling. We believe people generally seek to gain things and believe that senior decisionmakers of all types are generally successful at seeking gains.[14] Rationality is also compelling because it provides a relatively simple model: as long as we can define the costs and benefits, we can predict the choice by calculating the value of each alternative.

But rational models have come under increasing scrutiny by social scientists due to the observation that decisionmakers "are subject to the non-rational aspects of human decisionmaking that we all share biologically, which are more dominant in some kinds of decisionmaking than in others."[15] These non-rational aspects fall into two categories: one is motivational, and proposes that people are affected by emotions and desires; the second is cognitive, and proposes that there are some systematic non-rational tendencies in how people process information.[16] The term "bounded rationality" was introduced to describe theories of decisionmaking which are essentially rational but include these non-rational aspects. Because any coercion theory is dependent upon its model of the adversary's decisionmaking process, it may prove worthwhile to explore the merger of a bounded rationality model with airpower coercion.

One popular and compelling model of bounded rationality is called Prospect Theory. Daniel Kahneman and Amos Tversky developed a set of axioms in 1979 to modify the standard rational model of decisionmaking and explain systematic patterns they observed

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[14] George Quattrone and Amos Tversky, "Contrasting Rational and Psychological Analyses of Political Choice," *American Political Science Review* 82:3 (Sept 1988): 719.

[15] Paul Davis and John Arquilla, *Thinking about Opponent Behavior in Crisis and Conflict*, Paper N-3322-JS (Santa Monica: RAND Corporation, 1991), pp. 8-9.

[16] Quattrone and Tversky, p. 719; and Barbara Farnham, "Introduction" in Barbara Farnham, ed., *Avoiding Losses/Taking Risks* (Ann Arbor: University of Michigan Press, 1994), pp. 1-2.

in a series of social science research studies.[17] While the next chapter will more fully describe prospect theory and its principles, the theory basically posits that people frame their decisions depending on their perception of their situation, and then evaluate alternatives differently depending upon their frame. The theory offers many hypotheses about international behavior, including: state leaders take more risks to maintain their international positions, reputations and domestic political support than they do to enhance those positions; after suffering losses (in territory, reputation, or domestic political support), political leaders tend not to accept those losses, but instead take excessive risks to reverse them; and it is easier to deter an adversary from taking an action than to compel him to terminate an ongoing action or to undo what he has done.[18]

Prospect theory may be particularly appropriate for modeling behavior in coercion, as it is based on individual decisionmaking under risk. Among prospect theory's axioms are explanations for why people may choose risky options with probable higher costs—for instance, continuing to fight even though surrender is objectively less costly—and why people may change their decisions when the choices offered them have changed very little—for instance, not responding to one bombing campaign, but rapidly seeking negotiation when a similar campaign is restarted with no change in terms. The key to making prospect theory a tool for strategy is to understand which axioms of the theory are relevant to coercion (Ch. 3) and to integrate them into a coercion model (Ch. 4).

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[17] Daniel Kahneman and Amos Tversky, "Prospect Theory: An analysis of decision under risk," *Econometrica* 47:2 (March 1979): 263.

[18] See Jack Levy, "Prospect Theory, Rational Choice, and International Relations," *International Studies Quarterly* 41:1 (March 1997): 93, for these and other hypotheses supported by prospect theory.

Summary

Coercion is a conflict resolution strategy that attempts not to destroy or deny the adversary's capability to continue conflict, but rather to achieve success through threatened violence and negotiated outcomes. The most critical component of military coercion is an understanding of the decisionmaking mechanism which the coercer is attempting to influence with threats and bargains. Most theories of coercion presume a purely rational decisionmaking mechanism, and it is possible that developing a bounded rationality theory of coercion may better explain past coercion events, and promise better future implementation.

Chapter 3

Prospect Theory

> *Since its formulation by Kahneman and Tversky in 1979, prospect theory has emerged as a leading alternative to expected utility as a theory of decision under risk.*
>
> —Jack S. Levy, "An Introduction to Prospect Theory"

Prospect theory is a popular and robust theory of bounded rationality, yet it also is a theory that defies easy explanation. Scholars have published a wide variety of articles and studies addressing prospect theory's applicability to different fields. In particular, prospect theory is applied to microeconomics, management and organizations, and political science. However, prospect theory is also difficult to explain concisely, because it was developed as a group of explanations for systematic anomalies in decisionmaking, spanned by one "meta-theory" for how the explanations work together.[1] Some descriptions of the theory bear similarity to the old allegory about the three blind men and the elephant: the part in contact with each person is taken as a definitive symbol of the whole. It is important to recognize the "whole" of prospect theory if it is to be understood correctly.

[1] See Kahneman and Tversky's original article, "Prospect Theory: An Analysis of Decision under Risk," *Econometrica* 47:2 (March 1979), or Quattrone and Tversky, "Contrasting Rational and Psychological Analyses of Political Choice," *American Political Science Review* 82:3 (Sept 1988), in particular, p. 735.

A further complication arises from comparing and contrasting prospect theory with *expected utility* theory, which serves as the standard rational model for decisionmaking. *Utility* is a term that describes the personal value people assign to risky choices; in standard rationality, this value is not the same as the monetary or material value of a payoff. Just as people might find the gift of a fourth screwdriver to be less important than the first they received, the utility of the $100 that takes them from $300 net worth to $400 is greater than the utility from $1500 to $1600. Expected utility theory asserts "that individuals attempt to maximize expected utility in their choices between risky options: they weight the utilities of individual outcomes by their probabilities and choose the option with the highest weighted sum."[2]

Kahneman's and Tversky's seminal article was a direct challenge to expected utility theory; prospect theory says people still maximize utility, but they do so under additional rules and specific exceptions. Prospect theory also does not say that *all* people will make choices that are not clearly rational—instead, it says there are strong tendencies that prospect theory describes and that a *majority* of people will follow.[3] The clearest way to present prospect theory is to show four ways in which people violate expected utility theory, and then explain a two-step decisionmaking method—the meta-theory—which incorporates these four violations.[4]

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[2] Jack Levy, "An Introduction to Prospect Theory" in *Avoiding Losses/Taking Risks*, Barbara Farnham, ed. (Ann Arbor: University of Michigan Press, 1994), p. 9.

[3] The research behind prospect theory shows that 60-70% of people in any given decision problem will follow the tendencies prospect theory describes—thus, a majority of people will act in ways not in accordance with expected utility. See Levy, "Prospect Theory, Rational Choice, and International Relations," *International Studies Quarterly* 41:1 (March 1997): 90.

[4] At least two authors present prospect theory in a manner similar to this: Jack Levy in "An Introduction to Prospect Theory," pp. 10-15, uses six axioms; and Jeffrey Taliaferro in "Quagmires in the Periphery," *Working Papers* No. 97-6 (Harvard University:

Four Axioms of Prospect Theory

The first axiom of prospect theory deals with **reference points and risk propensity**. According to expected utility theory, rational decisionmakers will choose options which maximize their wealth. Instead, research finds that people are sensitive to *where they start* in evaluating outcomes—their decisions depend upon whether the outcomes are viewed as gains or losses from some neutral point.[5] This neutral or *reference point* is usually the status quo, a position of comfort with a hypothetical value of zero.[6] The following is one example:

> A) Imagine a choice between two options that imply personal gains. Option 1: A sure gain of $80.00. Option 2: A risky venture with an 85% chance of winning $100 and a 15% chance of winning nothing.
>
> B) Now imagine a second set of options that imply personal losses. Option 1: A sure loss of $80.00. Option 2: An 85% chance of losing $100 and a 15% chance of losing nothing.
>
> When confronted with the first choice set, most people prefer the sure gain over the risky venture, even though the expected value of monetary gain is $5 less. In the second set, individuals prefer the gamble over the sure thing, even though the expected value of monetary loss is $5 greater.[7]

Weatherhead Center for International Affairs, June 1997) uses a more concise, and generalized, set of four. Many other authors choose to describe the axioms instead as a series of "effects" or tendencies that vary from expected utility; these lists often grow to more than 10 effects. For the more determined reader, see Levy, "Prospect Theory, Rational Choice, and International Relations," *International Studies Quarterly* 41:1 (March 1997).

[5] For two corresponding descriptions, see N. Fagley and Paul Miller, "Framing effects and arenas of choice," *Organizational Behavior and Human Decision Processes* 71:3 (Sept 1997): 356-357, and Quattrone and Tversky, "Contrasting Rational and Psychological Analyses of Political Choice," pp. 720-721.

[6] Jack Levy, "Prospect theory and international relations" in *Avoiding Losses/Taking Risks*, Barbara Farnham, ed. (Ann Arbor: University of Michigan Press, 1994), pp. 120-121.

[7] Jeffrey Berejekian, "The gains debate: Framing state choice," *American Political Science Review* 91:4 (Dec 1991): 791.

This example was repeated in several studies, and prospect theory explains two aspects of it. First, reference points matter: if people were purely rational, then whatever choice they made in A above should also be made in B, either choosing the less risky option in both or the more valuable. Secondly, not only does the reference point matter, it indicates the *risk propensity* of the decisionmaker. Expected utility generally posits risk aversion for decisionmakers; for prospect theory, people's risk propensity varies by *domain*. If the reference point puts outcomes in the domain of gains, people are risk averse, but if they are in the domain of losses then they become risk seeking.

> For example, given a choice between a sure gain of $3000 and a 80% chance to gain $4000, 80% of subjects chose the certain gain of $3000. In contrast, in the domain of loss, given a choice between a sure loss of $3000 and a 80% chance of losing $4000, 92% of subjects chose the risky option.[8]

The second axiom of prospect theory is **loss aversion**, which describes how people value gains and losses differently. If people were strictly rational, then they should value $100 in a consistent manner—be willing to spend the same amount of energy for it—whether they are seeking to gain it or trying to avoid losing it. But the evidence is contrary.

> The basic finding is that losses hurt more than gains gratify. The pleasure people get from unexpectedly finding $10 is less than the pain they suffer from losing $10. Most people are disinclined to accept symmetric bets involving a fifty-fifty chance of winning or losing a given amount. As Jimmy Connors exclaimed, "I hate to lose more than I like to win."[9]

To understand how loss aversion is distinct from risk propensity, consider this illustration. Suppose you offer someone the choice between losing $200 and losing only $100 if they'll walk a certain distance. Keep increasing the distance until you find the

[8] Fagley and Miller, p. 358.
[9] Levy, "Loss Aversion, Framing, and Bargaining," p. 181.

point where they treat the two outcomes equally. Loss aversion suggests that if you turn this around so people either gain $100 for sure or gain $200 if they will walk a distance, the 'gain' choices balance at a distance *much shorter* than they were willing to walk to avoid loss. The strong tendency to avoid losses also rings true with personal experience; as Robert Jervis points out,

> I doubt if I am alone in having been willing to tolerate an unusually high risk of significant losses in return for the chance of paying no penalty at all or in having been willing to invest significant additional resources in a venture in the hope—I cannot say the expectation—of recouping a recent loss. It is not an accident that people are warned against throwing good money after bad—they often do. Similarly, economists tell us that it is not rational to be influenced by 'sunk costs'—having put a lot into a venture is not a good reason to continue with it. But the fact that this is a valid prescription does not mean the behavior is not common—indeed if it were not, there would be no need for economists to stress the point.[10]

The third axiom of prospect theory involves **framing**: people sometimes choose reference points based on factors outside the parameters of the decision.[11] In expected utility theory, people are assumed to make decisions that are *invariant*; given all the same decision parameters such as payoffs, probabilities, outcomes, and starting points or assets, no matter how the problem is presented, the decision remains the same. Prospect theory shows that people do respond to other factors, even the way problems are worded, to the extent of changing answers when nothing essential has changed. One striking example is the following:

> A group of subjects is given a hypothetical choice between alternative programs to combat the outbreak of a disease which was expected to kill 600 people.

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[10] Robert Jervis, "Political Implications of Loss Aversion," *Avoiding Losses/Taking Risks*, p. 24.

[11] Tatsuya Kameda and James Davis, "The Function of the Reference Point in Individual and Group Risk Decisionmaking," *Organizational Behavior and Human Decision Process* 46 (1990): 56.

> The first group is told that program A will save 200 people, while program B has a 33% chance of saving 600 people or 66% chance of saving none.
>
> The second group is told that 400 people will die in program A, while in program B there is a 33% chance that no one will die and a 66% chance that 600 will die.
>
> 72% of the first group prefer program A, while 78% of the second group prefer program B. The parameters of the decision are exactly the same.[12]

This tendency to change preferences based on some aspect outside the facts relevant to the decision is distinct from the effects of reference points. When people choose reference points based on recent changes in their assets, comparison with other people, or sensitivity to words used in describing a problem, they can psychologically put themselves in the domain of gains or domain of losses even though objectively *they are not in that domain*.[13] In the above example, people seemed to frame the decision differently because of emotional reactions to the words "saving" and "die." In business, casinos have found that customers will become more risky with their own money after losing "courtesy" chips given to them at the door than they will if they never receive the bonus. People are more inclined to buy products if they are convinced that 'everyone else' has them. Overall, the framing effect means that decision results can potentially be altered or manipulated by changing the context of the choice rather than its substance.[14]

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[12] This is a Kahneman and Tversky research finding, cited by Jack Levy in "An Introduction to Prospect Theory," *Avoiding Losses/Taking Risks,* p. 12. The first group had 152 subjects, while the second had 155.

[13] For more on the distinctions between reference points and framing, see Kameda and Davis, p. 56, and Fagley and Miller, p. 358.

[14] Barbara Farnham presents a rigorous analysis of Roosevelt's actions during the Munich crisis of September 1938 and proposes that FDR changed from one frame to another—with no external international changes in the situation—with the result that American policy rapidly changed from non-intervention to full participation in the negotiations. She attributes the change in frame to a change in emotions after an experience external to what was happening in Munich. See Farnham, "Roosevelt and the Munich Crisis: Insights from Prospect Theory" in *Avoiding Losses/Taking Risks*, pp.41-71.

The final axiom of prospect theory deals with uncertainty and **decision weighting**. While expected utility theory says that people multiply probabilities by payoffs, and choose the higher resultant outcome, prospect theory says that probabilities themselves are weighted differently depending on their 'size' rather than their absolute effects. In a gamble, people will treat a moderate decrease in odds from 20% to 15% differently than an decrease from 55% to 50%—the 5% effect is the same, but generally the 20% to 15% decrease is considered more drastic. In a study on this effect, subjects were posed with a 'forced' game of Russian roulette. It was found that people were willing to pay far more to reduce the number of bullets in a revolver from 1 to 0 than from 4 to 3—yet the reduction in the chance of being shot, 1 in 6, is identical.[15] Decision weighting is often described as a 'certainty effect' because the most pronounced effects are seen when probabilities are near zero or one. As Jack Levy explains,

> The overweighting of certain gains induces greater caution, while the overweighting of certain losses encourages the gamble. This helps to explain the tendency to sell winners too early (to lock in a certain gain) and to hold losers too long (and thus risk a larger loss in the hope of avoiding a certain loss.)[16]

Overall, in decision weighting people tend to overweight small probabilities, underweight moderate probabilities, and overweight probabilities close to certainty.[17]

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[15] Kahneman and Tversky, "Prospect Theory," p. 283. As the authors point out, if a person is going to pay more for one of the two situations, economic considerations should lead to paying more to reduce the bullets from 4 to 3, since the value of money should be reduced by "the considerable probability that one will not live to enjoy it."

[16] For both this example and a wide description of decision weighting effects, see Levy, "Loss Aversion, Framing, and Bargaining," p. 185.

[17] A number of studies put the 'break point' between overweighting and underweighting in the .10-.15 range; see Fagley and Miller, pp. 401-404.

The Meta-theory for Prospects

The tendency for decisionmakers to choose reference points is regarded as the central proposition of prospect theory.[18] The change in risk propensity and characteristic of loss aversion depend upon where the reference point is, which defines the domain of losses and the domain of gains. Similarly, the choice of frame is a psychological reference point and produces corresponding risk propensities, even if that frame is arbitrary and bears no logical relation to the current decision. Decision weighting has a complementary effect to reference points, as it exaggerates risks when probabilities are small or near certainty and downplays them when probabilities are moderate.[19]

To deal with the centrality of reference points and link the propositions—which have distinct effects—Kahneman and Tversky proposed a meta-theory or prospect decision process. The meta-theory proposes that decisionmakers approach problems in two steps: first, they **edit** or sort through the aspects of a decision to form a problem set; second, they **evaluate** or analyze the problem set with regard to the respective risk propensity and decision weights that apply.[20] Since the editing phase is most often associated with identifying "the reference point, the available options, the possible outcomes and the value and probability of each of these outcomes,"[21] many researchers label it as the ***framing of the problem***, even though framing as a proposition is a much more

[18] Levy, "Loss Aversion, Framing, and Bargaining," p. 180.
[19] To be more exact, the combination of weighting and risk propensities creates a utility curve that is concave for large probabilities and losses, convex for small probabilities and losses, concave for small probabilities and gains, and convex for large probabilities and gains. See Levy, "Prospect Theory, Rational Choice, and International Relations," p. 92 for one description of this combined effect.
[20] See John Hershey and Paul Schoemaker, "Prospect Theory's Reflection Hypothesis," *Organizational Behavior and Human Performance* 25 (1980): 395, and Levy, "An Introduction to Prospect Theory" in *Avoiding Losses/Taking Risks*, p. 14.
[21] Levy, "Prospect Theory, Rational Choice, and International Relations," p. 92.

circumscribed effect.[22] The evaluation phase exists as a simple application of rules generated by being in the domain of gains or losses and the non-linear weighting of probabilities.

In prospect theory, it is the combination of framing a problem and then evaluating it in specific ways that can generate non-rational decisions.[23] Most applications of prospect theory to international relations focus on framing as a central challenge. There are at least two reasons for this. First, framing induces the most non-linearity in decisions—the least easily explained deviations from rationality.[24] Second, framing is an intuitively appealing problem, for describing it entails laying out how a specific decisionmaker approaches and perceives a problem, rather than seeing all decisionmakers as homogeneous.

Among its applications to international relations, prospect theory seems to have particular potential for understanding military coercion. Coercion in the international system quite often involves human lives, and prospect theory's propositions are more strongly supported in problems involving human life than wealth or other assets.[25] In social science research on prospect theory, military problems appear to generate more consistent behavior with study subjects than do economic or social conflicts in choice, implying that coercion decisionmaking may be more subject to bounded rationality.[26] In

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[22] In reality, the important feature of editing is the choice of reference point, while framing as an effect is secondary. But quite a few scholars and researchers simply aggregate all of this under the label 'framing.'

[23] William McDaniel and Francis Sistrunk, "Management Dilemmas and Decisions," *Journal of Conflict Resolution* 35:1 (March 1991): 24-25.

[24] Levy, "Prospect Theory, Rational Choice, and International Relations," p. 92.

[25] See Fagley and Miller, "Framing Effects and Arenas of Choice: Your Money or Your Life," passim.

[26] William Boettcher, III, "Context, Methods, Numbers, and Words," *Journal of Conflict Resolution*_39:3 (Sept 1995): 572; and Miroslav Nincic, "Loss Aversion and the

considering the applicability of prospect theory to interstate politics, several of its propositions show consistency across decisionmakers of different nationalities, though there are mixed results regarding situations of group decisionmaking.[27] Finally, some studies have shown that national decisionmakers exhibit risk propensity consistent with prospect theory when dealing with the international system.[28]

These strengths of prospect theory support applying three key propositions to the study of military coercion. First, framing and evaluation form the central decision process; decisionmaker framing of problems is crucial because coercion depends upon understanding and manipulating the adversary's choice between alternatives. Second, risk propensities and loss aversion describe two cases or applications in the evaluation phase: risk avoidance in the domain of gains, and risk seeking in the domain of losses. Third, uncertainty or decision weighting outlines a third case or application in the evaluation phase: overweighting of probabilities by decisionmakers in the realm of small probability estimates. These facets of prospect theory will form the core of an airpower coercion model in the next chapter.

Summary

Prospect theory is complex, because in actuality it comprises a set of four different deviations from expected utility behavior and one meta-theory about how decisionmakers

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Domestic Context of Military Intervention," *Political Research Quarterly* 50:1 (March 1997): 97.

[27] On nationalities, see Ariel S. Levi and Glen Whyte, "A Cross-cultural Exploration of Reference Dependence," *Journal of Conflict Resolution* 41:6 (December 1997): 797; on the mixed picture regarding group decisionmaking, see Taliaferro, p. 4; McDaniel and Sistrunk, p. 40; and Eldar Shafir, "Prospect Theory and Political Analysis" in *Avoiding Losses/Taking Risks*, pp. 149-50.

approach problems and make choices. Overall, prospect theory does not predict universal behavior but rather says decisionmakers have strong tendencies for making non-rational choices in certain situations. Decisionmakers tend to choose **reference points**, often the status quo, from which they evaluate outcomes in terms of net gains or net losses. This evaluation then produces a characteristic **risk propensity**: risk avoidance in the domain of gains and risk seeking and **loss aversion** in the domain of losses. Decisionmakers may also choose psychological reference points or **frames** based on perception of the problem rather than actual payoffs, probabilities and choices, leading to risk behaviors that differ from the status quo domains of choice. Uncertainty leads to **decision weighting**, where probabilities may play an exaggerated role when they are small, or diminished when they are moderate. Decisionmakers link all these propositions by approaching problems in a **framing phase** to set the problem and reference points, and an **evaluation phase** to apply risk behavior and decision weights.

[28] Paul Huth, D. Bennett, and Christopher Gelpi, "System Uncertainty, Risk Propensity, and International Conflict Among the Great Powers," *Journal of Conflict Resolution* 36:3 (Sept 1992): passim.

Chapter 4

Merging Airpower and Prospect Theory

> *A theory that predicts when military coercion will succeed and when it will fail must focus on the target state's decisionmaking process, which, in turn, is affected by the relationship between the coercer's military strategies and the target state's vulnerabilities.*
>
> Robert Pape, *Bombing to Win*

Most airpower theories are theories of military victory: how does one use airpower to defeat the enemy? Victory or brute force theories focus on destroying the adversary's capability to continue fighting, while coercion focuses on making the adversary decide to concede. Unfortunately, the majority of coercive airpower theories say almost nothing about the enemy's decisionmaking process, a critical omission. If airpower or any other military force is meant to coerce an adversary, the decisionmaking process should be explicitly defined.

Robert Pape's theory of airpower in *Bombing to Win* is unusual in this respect. In its most general form, his theory models airpower as force applied to targets to trigger a mechanism that *causes some political change* in the adversary:[1]

Force → Targets→ Mechanism → Political Change

Figure 1. Pape's General Coercion Model

[1] Robert Pape, *Bombing To Win* (Ithaca: Cornell University Press, 1996), p. 56.

Using this model, Pape manages to integrate previous airpower theories as strategies for coercion. He asserts that airpower strategies such as punishment—defined by the primacy of civilian targets—attempt to trigger a decision mechanism—popular revolt or social disintegration—to achieve success without winning a total military victory.[2] Since the theories or strategies themselves often say little about the mechanism they were invoking, Pape deduces their mechanism from either the targets the theorists outlined or the final political outcome they prescribed.[3] The result is that almost nothing is said about the enemy decisionmaking within airpower strategies themselves; instead, all strategies are assumed to influence war costs and success probabilities.

The rational adversary decision process is the true center of Pape's mechanism, and airpower strategies are simply factors affecting that process. Many theories of coercion use a similar approach: Alexander George outlines factors such as demands, threats, and promises which will influence the rational actor, while others simplify further and describe "sanctions" which will "pressure" decisionmakers in the preferred direction.[4] Whether put into mathematical formulae, or conceptualized verbally, these theories relate decision parameters to costs and benefits to be weighed absolutely. Bounded rationality offers a more robust description of the decision process—one which will capture anomalies that standard rationality does not—and an airpower coercion model based on

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[2] Pape attributes punishment theory or strategy to Douhet, Trenchard and the Air Corps Tactical School, and goes on to align Risk (Thomas Schelling), Denial (the Luftwaffe; Committee of Operations Analysts), and Decapitation (Col. John Warden) in this type of rubric. See *Bombing To Win*, p. 57.

[3] While Pape might not agree with my characterization of his process, it is outlined specifically on p. 56 of *Bombing to Win*.

[4] Alexander George and William Simons, eds., in *The Limits of Coercive Diplomacy* (Boulder: Westview Press, 2nd ed., 1994), pp. 16-17; Gary Hufbauer and Jeffrey Schott, "Economic Sanctions in Support of Foreign Policy Goals," *Policy Analyses in*

prospect theory therefore needs to start with the underlying decision model and work up to airpower factors and variables.

Alternatives, Framing, and Evaluating

There are two factors at the core of a decisionmaking model: the options the decisionmaker faces, and the process of choice between options. In coercion problems, many authors see the choice as a decision to *change* what one is doing, based simply on the difference between the benefits of continuing and the costs of not continuing.[5] When the latter exceed the former, the actor chooses to change behavior. Unfortunately, this approach does not incorporate risk well, because risk affects not only what one is currently doing, but also what one might experience if one changes behavior.[6] As one commentator says, "Actors usually confront two risky options rather than one, for doing nothing or selecting the status quo or a negotiated agreement also involves risks."[7]

Coercion usually involves two choices or alternatives, for most coercion can be verbalized as "Stop doing what you are doing, do this instead."[8] This choice is between continuing or acquiescing, or between maintaining a status quo and negotiating. Each alternative involves different variables and probabilities. For instance, in a "continuing"

International Economics 6 (Washington, D.C.: Institute for International Economics, October 1983), pp. 2-3, 9.

[5] For a graphic depiction of this singular choice model, see Pape, p. 16.

[6] Risk is a decision where each option leads to one of a set of possible outcomes and where the probability of each outcome is known. Risk differs from uncertainty, where the probability of outcomes are not completely known, and from certainty, where the probabilities are known and equivalent to zero or one. See Jack Levy, "An Introduction to Prospect Theory," Barbara Farnham, ed., *Avoiding Losses/Taking Risks* (Ann Arbor: University of Michigan Press, 1994), pp. 8-9.

[7] Jack Levy, "Prospect Theory, Rational Choice, and International Relations," *International Studies Quarterly* 41:1 (March 1997): 98-99.

alternative, one might have to consider the probability of military success, the benefits of winning, and the costs of war, while in "acquiescing" one might have to assess the probability of negotiating successfully, the costs of acquiescing, and the benefits of any positive sanctions or "carrots" offered for agreement. The choices are not easily reduced to one equation because they involve different and distinct events.

Prospect theory's two-phase decision process integrates this choice between alternatives directly. *Framing the problem* is the decisionmaker's task of outlining the alternatives, the relevant variables and uncertainty, and the reference point for the decision. *Evaluating the decision* incorporates the risk propensities and decision weighting dictated by the framed problem. The result is a decision either to continue the current course of action (status quo) or to acquiesce to the coercer's demands. Alternatives themselves are not simply balanced against one another: prospect theory prescribes that they are defined while framing, and shaped by corresponding risk propensity and decision weights, before the evaluation. Thus, the use of this model for explanation or prediction prescribes looking for three aspects or inputs: the alternatives, the frame, and the risk/decision rules.

The prospect theory model therefore appears like this: [9]

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[8] George, for example, says that coercive diplomacy persuades the opponent to 1) stop short of a goal, 2) undo an action, or 3) make changes in government, all of which fit this verbalization. See *The Limits of Coercive Diplomacy*, pp. 8-9.

[9] This model modifies a similar chart created by Paul Huth, D. Scott Bennett and Christopher Gelpi in "System Uncertainty, Risk Propensity, and International Conflict," *Journal of Conflict Resolution* 36:3 (Sept 1992): 485, which focuses on initiating conflict rather than coercion.

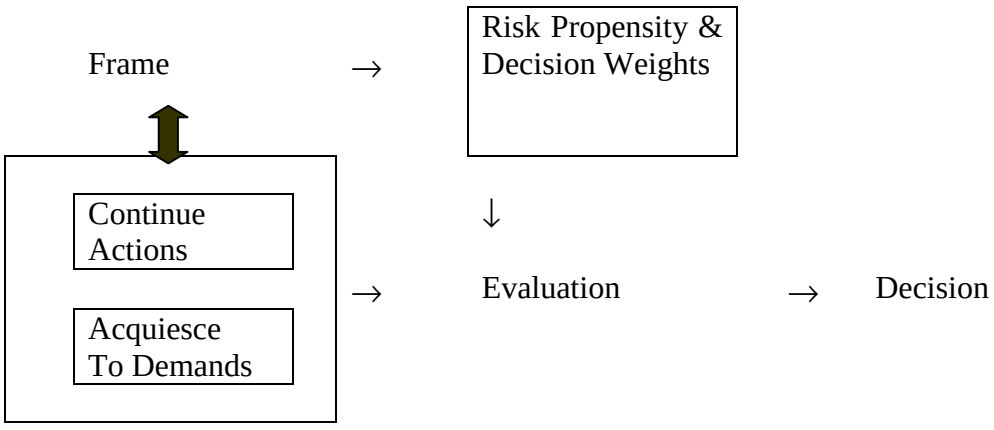

Figure 2. A Prospect Theory Decision Model

Interpreting the Model

Using the prospect theory decision model as a tool to explain decisions clearly calls for more information than a standard rationality model. Instead of needing only the possible payoffs and uncertainty or probabilities associated with them, one now requires the payoffs, probabilities, and reference point or frame, each of which are affected by the risk propensity and decisions rules to produce an evaluation.[10] To apply this decision model to coercion, the alternatives must be defined in terms of costs, benefits, and uncertainty, and the frame of the national decisionmaker must be identified.[11] The information required leads to three sets of questions:

1. What is the decisionmaker's reference point; i.e. against what do they measure gains/ losses, and in what context are gains/losses defined?

[10] Levy describes this challenge clearly: "Thus the framing of the choice problem is as critical to decisionmaking as is the evaluation of prospects, and requires intensive examination by the analyst. Evidence regarding precisely how an actor frames a choice problem must be independent of the outcomes the analyst wants to explain, of course, in order to avoid circular reasoning." See "Prospect Theory and International Relations" in *Avoiding Losses/Taking Risks*, Barbara Farnham, ed. (Ann Arbor: University of Michigan Press, 1994), p. 130.

[11] Focusing on a national decisionmaker supports prospect theory's greater validity for individuals rather than groups.

2. What variables and uncertainty are associated with the alternatives of Continuing and Acquiescing?
3. What kinds of airpower strategies are possible, and how do they relate to these variables?

A number of studies suggest that national decisionmakers may define their own reference points in terms of three areas—areas which are to some extent observable.[12] In an extensive study of prospect theory and international conflict, Paul Huth describes the first two as: the *preferred military/industrial position* relative to states of interest, and *domestic political conditions*.

> The deterioration of a state's relative industrial-military position causes national elites to frame decisions from the domain of losses because, in the absence of conflict, elites know that they will value next year's power position less than they value this year's power position. Domestic political conditions can lead elites to frame decisions from the domain of losses when they feel that their internal power position is weakening, making them vulnerable to being removed from office (by elections or other means).[13]

Military and industrial positions can be measured (by the coercer or the adversary) in a number of ways, including the comments of leaders on their nation's international status. However, domestic political conditions—relating the decision context to personal status and power positions—may best be assessed by determining who can reward or punish the leader.[14]

If reference points are at least partially dependent on the decisionmaker's personal position and the actions of those who can influence him, then a third area for assessing

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[12] As Levy notes, a number of studies show that national leaders "often speak explicitly in terms of gains or losses," which provides a direct basis for inducing their reference points or frames. See "Prospect Theory and International Relations" in *Avoiding Losses/Taking Risks*, p. 127.
[13] Huth et al., p. 499.
[14] Robert Jervis suggests this in "Political Implications of Loss Aversion," *Avoiding Losses/Taking Risks*, p. 25.

the frame can be an estimate of any political or social agendas. The "message" or "spin" that domestic actors in the adversary state place on a situation is a framing factor we can label as *manipulation of the social context*.[15] This factor addresses the conscious actions either by leaders or others on the domestic scene to affect how situations are viewed. Quattrone and Tversky allude to this effect in their review of how incumbent political candidates seem to possess electoral advantages independent of issues and party affiliations. In a study of how nations justify and execute military interventions, Miroslav Nincic finds that leaders will advocate international interventions in terms of protection (loss aversion) rather than advantage (relative gains) to garner greater public support.[16] Assessing the status and relative importance of each factor is a means of estimating adversary framing in coercion; the factors are summarized in table 1.

Table 1. Factors of Framing

Determinants of National Decisionmaker Frames
1) Preferred Military/Industrial Position
2) Domestic Political Conditions
3) Manipulation of Context by domestic actor

Defining the alternatives within the frame requires some generalization of what variables or factors relate to the choices of Continuing or Acquiescing. In Pape's formulation, probabilities, benefits and costs are integrated into one equation, and the basic factors are: 1) the probability of attaining benefits, multiplied by 2) the value of the

[15] Jeffrey Berejekian describes this as a 'new dimension of power' in the sense that political leaders seem to be aware of the impact they can have in manipulating frames; see "The Gains Debate," *American Political Science Review* 91:4 (December 1991): 796.

[16] See George Quattrone and Amos Tversky, "Contrasting Rational and Psychological Analyses of Political Choice," *American Political Science Review* 82:3 (Sept 1988): 719-

benefits themselves, less 3) the probability of suffering costs, multiplied by 4) the potential costs of resisting.[17] As explored in the previous chapter, however, the alternative of Continuing to resist has three variables: the *benefits* of resistance multiplied by the *probability of success*, less the *future cost* if the coercer carries out the threat. The alternative of Acquiescing to the coercer's demands also has three variables: the *terms of defeat* multiplied by the *expectation of negotiation* that can reduce the terms, plus the value of positive sanctions or *inducements* to acquiesce.[18] The cumulative costs of the conflict are eliminated from the decision, since they are common to both alternatives.[19]

736, and Miroslav Nincic, "Loss Aversion and the Domestic Context of Military Intervention," *Political Research Quarterly* 50:1 (March 1997): 97-120.

[17] See Pape, *Bombing to Win*, p. 16. Despite a lengthy discussion, Pape never specifies whether this is a static or dynamic decision: are the benefits/costs measured from the beginning of the conflict, or at successive decision points? One can only infer from his treatment that it is static. Also, while Pape creates and cites a mathematical formula, this paper avoids doing so: the intent, in the end, is to assess general sizes or appreciations of the variables and not to 'calculate' values that cannot be exactly measured in any event.

[18] If we wanted to use real values for these representations, then Terms of Defeat could be the potential *positive* value for the surrender (with respect to the adversary.) If instead one inserted the overall, and probably negative, value of Defeat, then (1 – Expectation of Negotiation) would be the appropriate modifying probability. The concept of positive sanctions or inducements as being significant for this choice is owed to David Baldwin, "The Power of Positive Sanctions," *World Politics* 24:1 (Oct 1971): 23, and Alexander George, *The Limits of Coercive Diplomacy*, pp. 16, 28.

[19] Kahneman and Tversky called this elimination of facets common to both choices 'isolation,' and attributed it to the editing or framing phase of decision. The isolation effect often downplays factors that seem the same even though they may, if included, significantly change the relative outcomes. See "Prospect Theory: An analysis of decision under risk," *Econometrica* 47:2 (March 1979): 271-273.

Table 2. Coercion Variables

Rational Model		Prospect Theory	
	Continuing		Acquiescing
Benefits X Probability Of Success	Benefits		Terms of defeat
- Costs of Resistance	X Probability Of Success		X Expectation of negotiation
X Probability of Suffering costs	- Future Costs	+	Inducements
Measured from beginning of conflict or status quo	Measured from	frame / reference	point chosen

How value is assessed is another key difference between these two formulations of choice (i.e., Pape's rational description versus prospect theory). In the prospect theory model, benefits, future costs, and terms of defeat are values measured from the decisionmaker's frame, which may not necessarily be either the objective state at the beginning of the war or the current status quo. This is one of the critical junctures of prospect theory, for a coercer who simply assumes his adversary is rational usually has no appreciation of how the adversary is assessing his options nor of how the coercion strategy is affecting the decision.

Airpower Factors and Variables

To establish an airpower theory of coercion, airpower strategies must be linked to coercion variables and framing. In the classic understanding, "force is exercised in order to destroy things of value and to cause suffering which, it is expected, will motivate the opponent to take steps to avoid the infliction of such damage in the future."[20] This corresponds to Robert Pape's general model of coercion, in that airpower applies force on targets to activate a mechanism for change. In *Bombing to Win*, airpower strategies are linked one-for-one to variables in the coercion calculus: punishment affects costs of resisting, denial affects probability of success, risk affects probability of future costs, and decapitation affects both costs of resisting and probability of success.[21]

Though the attempt to link strategies to the decision process is laudable, Pape's formulation suffers two faults. First, he isolates the effect of airpower strategies to specific variables, allowing neither for multiple effects (e.g., punishment targets affecting probability of success, success benefits, and future costs) nor for hybrid strategies (e.g., a punishment and denial campaign to affect several parts of the decision process simultaneously.)[22] The independent strategy-to-single variable assumption obscures the role of the decisionmaking mechanism—basically, strategies are treated as mechanisms themselves instead of factors. Since airpower strategies are largely defined by the target sets, the implication is that hitting certain targets causes specific changes. This leads to

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[20] Barry Blechman, "The Consequences of the Israeli Reprisals," Ph.D. Dissertation for Graduate College of Georgetown University (May 1971): 13.

[21] The astute reader will note that Pape sees no airpower or force influence on benefits themselves; he claims that the territory or political aims involved cannot be affected, a view for which he has been criticized. For this distinction, and his alignments as noted, see *Bombing to Win*, pp. 16, 18-19, 80.

the second fault, that of the so-called "risk" strategy. Pape attributes that strategy to Thomas Schelling, and defines it as an escalating punishment threat. However, Schelling's concept of strategy was not so limited: he used graduated risk—the presentation of increased threat until the target state changes behavior—to define coercion. All coercive airpower strategies are therefore, by definition, risk strategies. Punishment, denial and decapitation are, in fact, airpower strategies with different threats—types of targets and intended costs—and "risk" should be discarded as a strategy.

Pape also consciously excludes any positive use of military force to influence the adversary's decisionmaking.[23] This paper argues that a fourth airpower strategy for coercion exists in airlift, where goods and services may be provided to interfere with the adversary's objectives, act as an inducement to acquiesce, or even influence relevant military/industrial positions in an effort to manipulate the adversary's decision frame. The use of positive force is logically coherent in either a rational or prospect theory model of coercion, as it is directed at manipulating costs and benefits within the decisionmaking process. It also has historical precedence in coercion events.[24]

There are also other ways of considering airpower strategy that would considerably broaden the means of influencing adversaries. Group Captain J. S. Hamwood of the Australian Air Power Studies Centre suggests that, "by applying air power in graduated

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[22] For descriptions and criticisms on this point, see Barry Watts, "Ignoring Reality," *Security Studies* 7:2 (Winter 97/98): 146-148, and Karl Mueller, "Strategies of Coercion," *Security Studies* 7:3 (forthcoming, Spring 1998).

[23] Pape focuses on military vulnerabilities and military force on targets; see *Bombing to Win* pp. 1, and 14-15.

[24] Consider, for example, 'Hump' operations in the China-Burma-India operations of WW II, the Berlin Airlift, and the US airlift to Israel in the October War of 1973. See

steps from surveillance through to precision strike, leverage can be exercised with the required degree of finesse to demonstrate displeasure reinforced by conviction."[25] His outline of airpower strategies includes reconnaissance, airspace restrictions, offensive probes, and electronic countermeasures, in addition to force-related uses inherent in precision strike. While his perspective is logically consistent with the coercion model—there may be a variety of ways to effect the mechanism for coercion—Group Captain Hamwood's strategies are more properly missions, which might be executed in some combination to support a strategy.

This paper will focus on four strategies that are more prominent and easily identified in historical events: punishment, denial, decapitation, and airlift. In the airpower coercion model, these four strategies do not have discriminate effects—i.e., they do not solely influence one variable at a time—and do not have to be used separately. Punishment, denial, decapitation and airlift strategies can, in theory, influence several factors at once; most strategies will affect both framing and one or more variables in the alternatives.[26] Similarly, it seems reasonable to anticipate that coercers will try to influence the adversary decision with a combination of means or strategies: precision adjustments of variables are not the objective, change in political behavior is. Figure 3 simply illustrates how airpower strategies have multifaceted rather than singular effects.

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also David Baldwin, "The Power of Positive Sanctions," *World Politics* 24:1 (Oct 1971): 19-38.

[25] J.S. Hamwood, "Graduated Response By Air Power," *Paper No. 7* (Canberra: Air Power Studies Center, Oct 1992), pp. 4-5, 20.

[26] Even Douhet recognizes that fidelity is difficult to achieve; see his discussion of targeting in *Command of the Air*, pp. 50-51.

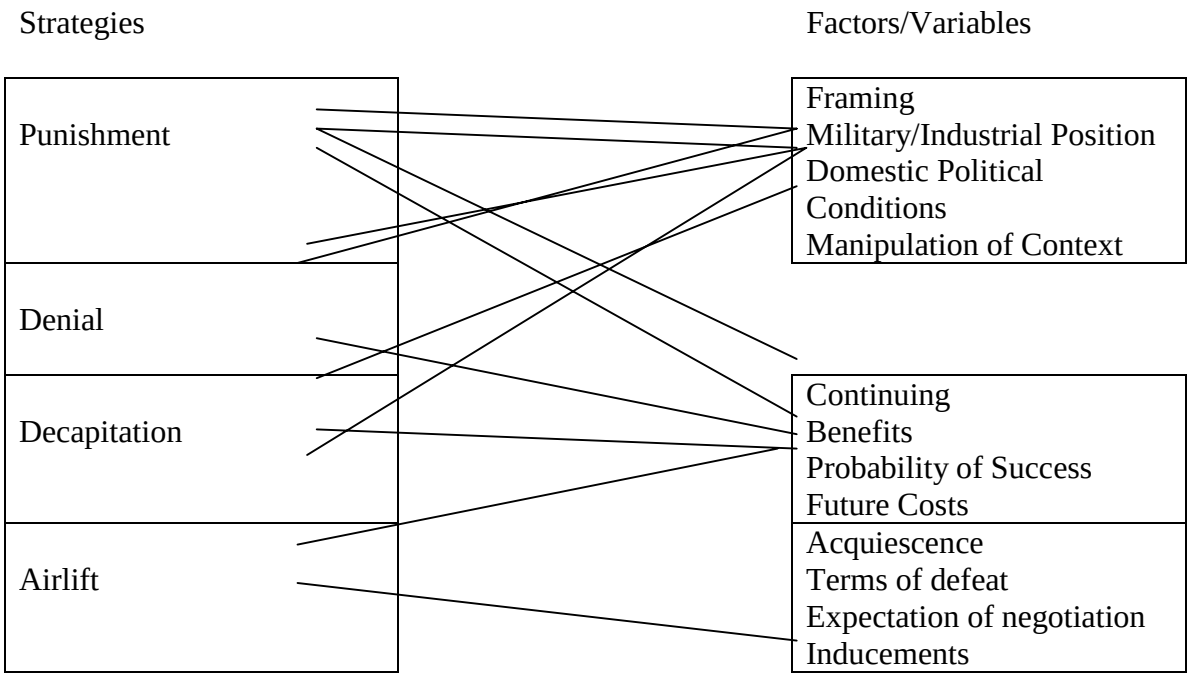

Figure 3. Relation of Airpower Strategies to Coercion Variables (Notional)

Risk and Decision

There are three cases in which prospect theory predictions are expected to be different from rational choice predictions, and the coercion model can account for each. Once the decisionmaker's frame and conception of alternatives are assessed, prospect theory can describe the risk propensity and appropriate decision weights for evaluation. In the first case, a decisionmaker whose point of reference is worse than the status quo is in the domain of gains. Both alternatives promise outcomes better than that reference point.[27] Due to this framing of the problem, decisionmaker behavior is likely to be risk-averse; that is, one will evaluate the decision in favor of alternatives that seem more

[27] It is worth reiterating that prospect theory explains anomalies in the rational model, and this is why we only are looking at situations where both alternatives present gains, or both present losses. In the other situations (one loss choice, one gain choice) prospect theory will not propose anything significantly different than standard rational theory, and therefore would not be more useful.

certain, even if expected utility calculations might slightly favor the riskier alternative.[28] As a general rule, a national leader in the domain of gains will pay more attention to the probability of outcomes than to the payoffs themselves.

The domain of losses is the second relevant coercion case. When the decisionmaker has a point of reference better than the current status quo, and the alternatives both present net losses relative to that point, he is in the domain of losses. Neither continuing to resist nor surrendering present satisfactory outcomes. The desire to strive for the reference point leads the decisionmaker to risky behavior: he will evaluate in favor of alternatives that gets him closer to the chosen reference point, even if it is less likely or might cost him more. As a general rule, a national leader in the domain of losses pays more attention to payoffs than to the probability of outcomes.

Decision weighting suggests a third case distinct from domains: in situations where the uncertainty in both alternatives is relatively low (less than 15%), prospect theory proposes decisionmakers will overweight the small probabilities.[29] The effect also increases: the smaller the probability (once it crosses the 15% threshold), the more it is overweighted. Thus, a low probability of success and a simultaneous low expectation for negotiating better terms may lead decisionmakers toward forlorn hopes and last-ditch efforts to recoup. For coercion events, it may present an appearance that the decisionmaker is ignoring probabilities and pursuing only the payoffs; this is because

[28] In fact, a number of studies suggests that this difference in expected utility may be from 20-30%, meaning decisionmakers in the gains domain might choose a more certain outcome with 20% less expected payoff. See Levy, "An Introduction to Prospect Theory," *Avoiding Losses/Taking Risks*, p. 10.

[29] A number of studies have found this "breakpoint" for small vs. large probabilities to be in the .10-.15 range. See Levy, p.19, and John Hershey and Paul Schoemaker, "Prospect Theory's Reflection Hypothesis," *Organizational Behavior and Human Performance* 25 (1980): 403-404.

continuing resistance almost always promises a more positive end state than even the best surrender terms—and thus, overweighted probabilities put an inordinate emphasis on the larger payoff of continuing resistance, however unlikely success may be.

With all three aspects of the prospect theory decision model defined, the airpower coercion model appears as below.

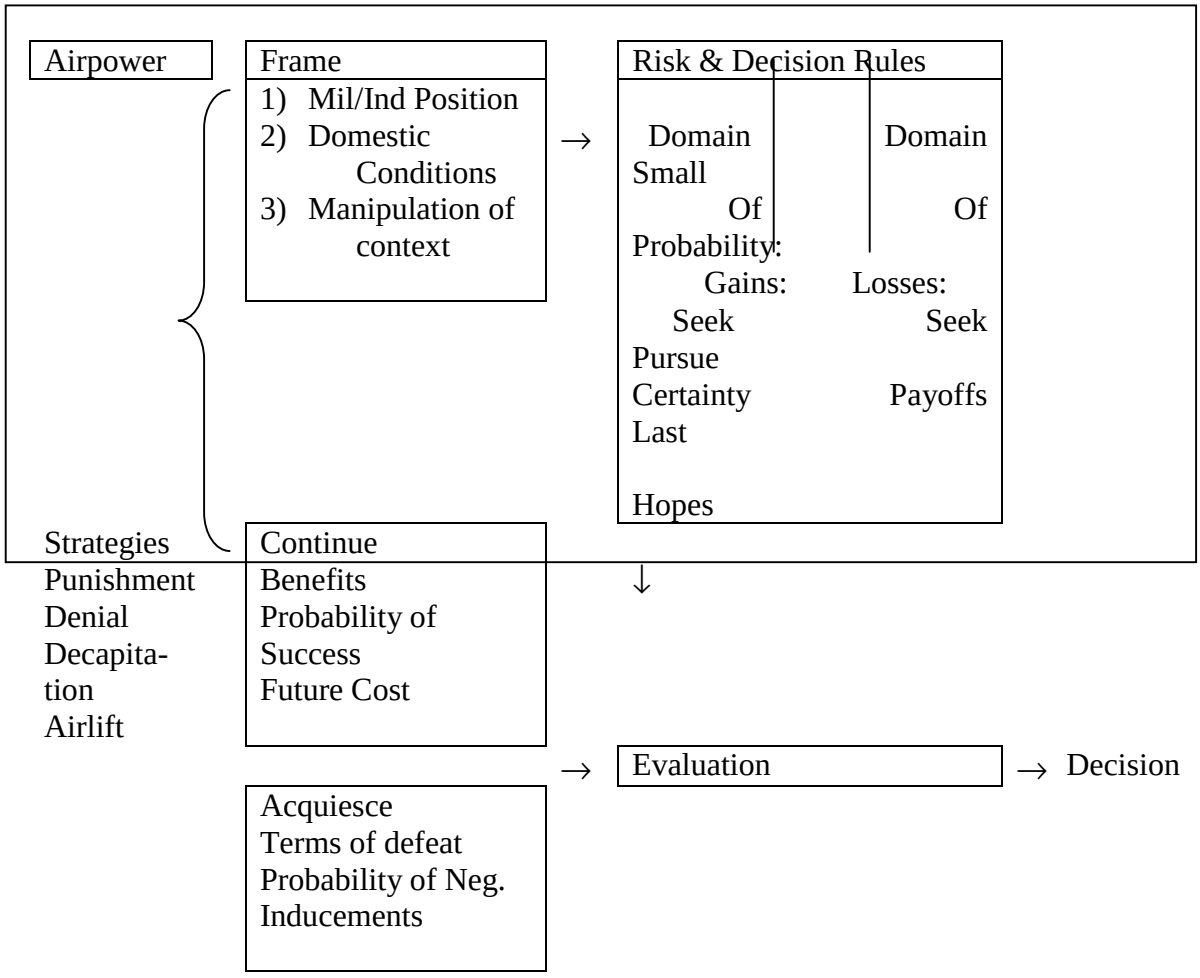

Figure 4. A Prospect Theory Airpower Coercion Model

Summary

A general model of coercion deals with the use of force to influence a mechanism to achieve political change or action. The mechanism in the model necessarily depends on

the adversary's decisionmaking process, which in most theories of coercion is implicitly or explicitly rational. The prospect theory of coercion depicts a different decision model at the center of the mechanism, one which relies on framing or choice of reference point, two alternatives of Continuing or Acquiescing, and prescribed risk/decision rules which interact in evaluation to produce the decision or political change.

Framing can be defined through at least three perspectives of the national leaders: the military and industrial position, the domestic political conditions, and conscious manipulation of the social viewpoints by any domestic actor. The factors of choice are defined as: for Continuing, there are benefits, the probability of achieving benefits, and the future costs of resistance; for Acquiescing, there are terms of defeat, the expectation of favorable negotiations, and inducements offered to cooperate. Finally, there are four relevant airpower strategies, each of which have multiple effects in the model: punishment or destruction of targets of value; denial or destruction of ability to gain objectives; decapitation or attempts to limit/eliminate decisionmaker control; and airlift or provision of goods and services to either complicate adversary strategy or provide inducements to cooperate.

The framing of the problem and alternatives are guided by risk and decision rules in accordance with prospect theory's principles. This produces three cases for evaluation of coercion events: the domain of gains, where actors focus on higher probabilities; the domain of losses, where actors focus on better payoffs; and situations of small probabilities, where actors overweight probabilities. Each case is separable and prescribes distinct decisionmaker behavior.

Chapter 5

Airpower Coercion

> *If prospect theory has correctly identified a number of pervasive human tendencies which confound the expectations of rational choice theory, it is crucial to find out whether, and in what manner, those attributes affect the ability of political decisionmakers to cope effectively with such problems.*
>
> —Barbara Farnham, *Avoiding Losses/Taking Risks*

A good theory must at least explain something: theory attempts to provide a simplification of reality, in order to understand how something works.[1] An airpower theory of coercion deserves little attention if it cannot explain the past—or at least, explain it better than alternative theories. Since the prospect theory model of coercion is a development beyond the simple rational model, it is appropriate to compare their interpretations of the same events. And, because the two theories agree in some circumstances, the best events for exploration are those which present explanatory problems for rational coercion theory.[2]

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[1] While there are a number of people who write about this, I find Kenneth Waltz' discussion in "Evaluating Theories," *American Political Science Review* 91:4 (Dec 1997): 913-917, to be most useful. In that article, he says that "explanation, not prediction, is the ultimate criterion of good theory, that a theory can be validated only by working back and forth between its implications and an uncertain state of affairs that we take to be the reality against which theory is tested, and that the results of tests are always problematic."

[2] Because this thesis only explores prospect theory vs. standard rationality for anomalous cases, it is not intended as any sort of 'proof' of universal superiority—were such a task possible, one would have to also look at cases where both 'agree' to assess overall utility in explanation, and even prediction.

The model developed in the previous chapter suggests an approach for exploring prospect theory's utility. First, historical coercion events can illustrate decisionmakers framing problems, describing alternatives, and reacting to airpower. Second, the explanatory power of prospect theory and rational theory can be compared. To provide clarity, the events in question will be organized by risk/decision rule cases: the domain of gains, the domain of losses, and small probabilities.

The Domain of Gains: An Adversary with Advantages

Nations often resort to coercive strategies when their ability to impose surrender is limited. As Alexander George notes, coercion "is sometimes chosen by the defender not because of its attractions but rather…because at the inception of the crisis, political-diplomatic support, or military readiness, for a resort to force is lacking."[3] When an adversary believes they can win and keep objectives by resisting or could achieve most objectives by negotiation, they are in the domain of gains: they are an adversary with advantages. This set of conditions existed in Vietnam and Bosnia, and it reveals some insights that prospect theory offers.

In Vietnam, there are two periods of interest. During the Rolling Thunder campaign of 1965-67, North Vietnam's goal was a united nation under communist control.[4] It possessed conventional forces in the north, and unconventional or guerrilla forces in the south, and it knew the United States desired negotiation.[5] Hanoi's reference point was

[3] Alexander George and William Simons, eds., *The Limits of Coercive Diplomacy* (Boulder: Westview Press, 1994), p. 10.
[4] In some cases this paper will refer to the state as a label for its national leaders or decisionmakers; when necessary or pertinent, specific leaders will be mentioned.
[5] On North Vietnamese aims, see Mark Clodfelter, *The Limits of Air Power* (New York: The Free Press, 1989), pp. 205-6, and Yuen Khong, *Analogies at War* (Princeton: Princeton University Press, 1992), pp. 234-235.

therefore a singular Vietnamese state. From this frame, it could continue to fight for victory with a probability of success considered by Ho Chi Minh to be high in the long run, or it could acquiesce to President Johnson's terms. Those terms would mean no gain or a loss, with a low expectation of negotiating anything approaching North Vietnamese objectives. US leaders defined acquiescence as a cease-fire with continued US presence in the south—an unpalatable end for the North.

Airpower was basically employed in a punishment strategy: the US intended to demonstrate it could hit targets of value in the North in a graduated fashion.[6] If the US recognized the magnitude of North Vietnamese commitment, the rational approach would suggest that punishment threats would have to be massive to outweigh the significant benefits sought by North Vietnam. The graduated strikes of Rolling Thunder never seemed to achieve the status either of massive punishment, or of threatening greater costs than the benefits sought. A denial campaign could have lowered the enemy's probability of near-term success, but without some increase in costs—or extreme reduction in the Communist expectation of long-term victory—it might never change behavior under the rational model.

Prospect theory holds that in the domain of gains, the North Vietnamese would seek certainty; thus, airpower could try to decrease their military effectiveness while diplomacy raised expectations for favorable terms through negotiation. A punishment strategy might decrease the *benefits* of success—in this case, it would have to decrease the value of unification with the south, a somewhat untenable goal—but only denial and decapitation strategies could offer a means to influence the *probability* of success. Overall, both theories explain Rolling Thunder's lack of success, but prospect theory may

better describe the artificiality of expecting military force alone to trigger a change in behavior. As long as North Vietnam's expectation for favorable negotiations was so low—the US was determined to remain in the South—airpower could do little to help.

In the second period, the Linebacker I and II campaigns of 1972, two things changed: North Vietnam shifted to a conventional strategy vulnerable to denial, and the US shifted its demands from a cease-fire in place to a cease-fire with a promise of US withdrawal.[7] This affected North Vietnamese framing: while the reference point remained reunification, the alternatives changed. Continuing the fight still promised eventual success, but North Vietnam's shift from unconventional to conventional warfare meant their probability of success was more vulnerable. In addition, their expectation for favorable negotiations increased, because the US intended to withdraw all its forces.

Airpower strategies for the US in both Linebacker campaigns now included punishment and denial aspects. Advocates of a rational decision model might say the denial campaign was effective in lowering the probability of success, but prospect theory better explains North Vietnamese behavior: continued resistance would both weaken North Vietnam's capabilities and stretch out attainment of their goals, while negotiation could preserve capabilities and get the US out of the war. Standard rationality faces a problem: if the North was so willing to bear costs, why would denial succeed before making their expectations for winning the war extremely low?[8] The answer is that North

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[6] Clodfelter, p. 204; Pape, *Bombing to Win*, pp. 176-177.
[7] See Pape, p. 197, and Clodfelter, pp. 204-205.

[8] John Mueller argues that the 'breaking point' for the North in terms of costs was virtually unprecedented; for the rational model, this implies either an extremely large benefits estimate for which the probability must be driven down substantially…or a costs estimate not measuring lives and industry. In this situation, a good denial campaign still

Vietnam was coerced into allowing the US a somewhat graceful exit from the war, but was in no way coerced to *end* the war as they, the North Vietnamese, framed it.

Similarly, in NATO's 1995 Deliberate Force campaign, the Bosnian Serbs were an adversary with an advantageous position. While many commentators aggregate the Bosnian Serbs and Yugoslavia together as a single decisionmaker, it may be more accurate to describe two frames. By fall 1994, Slobodan Milosevic perceived a balance in military/industrial positions between his own nation of Yugoslavia and other regional states: Bosnian Serbs controlled significant territory with minimal future costs, while negotiations offered some prospect of keeping a majority of Bosnia's territory and relieving Yugoslavia of economic sanctions. In comparison, the Bosnian Serb leader, Radovan Karadzic, foresaw continued military success that he believed might enhance future negotiations even more and thus improve his relative military/industrial position.[9]

The air strategy of Deliberate Force was primarily denial, focusing on military targets and Bosnian Serb capabilities, and operations included a pause of four days after the first two days of bombing.[10] The standard rationality approach suggests that the denial campaign would primarily work on Bosnian Serb and Serbian perceptions of continued success, with a change in behavior being triggered when the costs of continued resistance were sufficiently large. Norman Cigar describes the rational viewpoint in proposing that the major impact for the Bosnian Serbs was not the airstrikes as much as a

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does not explain a change in behavior. See Mueller, "The Search for the Breaking Point in Vietnam," *International Studies Quarterly* 24:4 (Dec 1980): 497-519.

[9] These frames are best described by Norman Cigar, "How Wars End," *South East European Monitor* 3:1 (1996): 14-18. See also Karl Mueller, "Strategies of Coercion," *Security Studies* 7:3 (forthcoming, Spring 1998): 52, and Col. Robert Owen, "The Balkans Air Campaign Study: Part 1," Airpower Journal 11:2 (Summer 1997).

[10] See Col. Robert Owen, "The Balkans Air Campaign Study: Part 2," Airpower Journal 11:3 (Fall 1997): 16.

simultaneous Croatian and Bosnian (Muslim) land offensive.[11] The rational explanation is that the Serbs were coerced by significant air *and* ground threats to military forces.

Prospect theory may better account for the change in Serbian behavior associated with Deliberate Force and subsequent comments by Serbian leaders.[12] Given that most commentators consider the actual damage inflicted by the airstrikes to be relatively minor, why would the Serbs assert that the air campaign brought them to the negotiating table? If both Milosevic and Karadzic were in the domain of gains, it may be that the air strikes shifted the balance of alternatives to the *more certain* gain—acquiescence. As a denial campaign, Deliberate Force lessened the *probability* of success because the Serbs were convinced of future NATO actions—a commitment to continue forcefully opposing the Serbs—so that continued resistance offered less substantial gains than negotiation.

Coercion in the domain of gains suggests particular airpower strategies: when the opponent has an advantage, denial campaigns are important for shifting the adversary's estimates of probabilities. It may also be necessary, however, to shift the corresponding payoffs by changing terms of acquiescence more positively or raising future costs. The primary airpower contributions to coercion in this domain appear to be those strategies that impact the probability of continued success: denial and decapitation.

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[11] See Cigar, pp. 19-21, and Cerami, "Presidential Decisionmaking and Vietnam: Lessons For Strategists," *Parameters* 26:4 (Winter 96/97): 7-8.

[12] See Owen, "The Balkans Air Campaign Study: Part 2," p. 20, for an oft-cited quote of Karadzic, a Bosnian Serb leader: "We are ready for peace. Why did you bomb us?" This is not well explained by an approach that argues the ground offensive's effects were the true motivation for Serbian acquiescence.

Table 3. Domain of Gains Coercion

Event	Frame of Adversary	Strategy Of Coercer	Rational Explanation	Prospect Theory Explanation
Rolling Thunder 1965-67	Domestic Pol Cond: Civil War & US desires to remain	Punishment	Won't work…and denial cannot destroy unconv. forces	Won't work; acquiescence offers little in any case
Linebacker I/II 1972	Domestic Pol Cond: Civil War & US desires to withdraw	Punishment/ Denial	Denial will work against conv. forces …needs to do a lot	Acquiescence offer better; punish & deny may swing choice
Deliberate Force Aug/Sep 1995	Mil/Ind Position: Control good & negotiations possible; balanced alternatives	Denial	Will work but only if costs of resistance are large & looming	May be enough by itself to swing choice to acquiescence

The Domain of Losses: Bleak Horizons

A second interesting situation occurs when national decisionmakers frame themselves in the domain of losses and believe they have moderate chances for success with their strategies. These conditions were present for the Soviet Union in the Berlin Airlift, and for Iraq before and during Desert Storm.

While the events and factors leading up to the Berlin Blockade of June 1948 to June 1949 reflect the complexity of post-war politics and international restructuring, the Soviet framing of the situation—once the blockade was initiated—is relatively straightforward. Soviet dictator Joseph Stalin's reference point focused on the relative military and industrial positions of the USSR and the Western democracies: Germany, and specifically Berlin, was a fulcrum, whose control would mean growth and additional security for the Soviets.[13] Western efforts to restructure Germany as a democracy, with a

[13] See Hans-Ludwig Paeffgen, *The Berlin Blockade and Airlift* (Ann Arbor: University Microfilms International, 1979), pp. 1-3, and Col. Abdul Azziz H. Shokair, "Berlin

government in Bonn, and reform of currency threatened a critical loss of Soviet control and influence, both globally and in Eastern Europe.[14] Soviet resistance was defined by the continued blockade of Western traffic, with expected benefits of Western forfeiture of Berlin, a reasonable chance for success, and low risk of future costs because of Western military demobilization. From the Soviet perspective, Western 'intransigence' on the control and economy issues provided little expectation of favorable negotiation, and there were no inducements offered.

The US and allied military response was twofold: a massive airlift to supply Berlin and counter the blockade, and positioning of a small force of B-29s in Europe for military and political effects.[15] For the proponents of a rational model, the eventual lifting of the blockade implies that Soviet expectations of success in continuing the action became small while costs grew. While theoretically the B-29s presented large costs in the form of an implied nuclear threat, their positioning was complete by fall 1948 with no change in Soviet behavior. The airlift to defeat the blockade was 'proved' successful, and thereby greatly reduced the probability of Soviet success, when airlift grew stronger rather than weaker through the winter of 1948-49. The major contribution to coercive success from the rational perspective was the Allied counter-blockade, which heavily

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Airlift," *Air War College Research Report* M-U43117 (Maxwell AFB: Air War College, 1990), p. 9 for thoughts on Stalin's worldview.

[14] See Lucius Clay, *Germany and the Fight for Freedom* (Cambridge, MA: Harvard University Press, 1950), pp. 24-30, and Frank Donovan, *Bridge in the Sky* (New York: David McKay Company, Inc., 1968), pp. 28-37, on Soviet concerns with loss of control as motivation behind the blockade.

[15] The B-29s play a minor role in most histories, but are still debated as to coercive contribution. See Walton Moody, *Building a Strategic Air Force* (Washington, D.C.: US Government Printing Office, 1995), pp. 209-214, and Paeffgen, p. 352.

restricted trade with the Soviet bloc and threatened Moscow with increased costs, while the airlift made the Soviet strategy ineffective.[16]

Prospect theory proposes that the Soviet frame was in the domain of losses, and that Moscow's responses would correspondingly *seek risk* with a focus on payoffs rather than probabilities. Thus, as long as the Soviets viewed acquiescence—ending the blockade—in terms of losing control and influence, the benefits of continuing the blockade would win out. Within this model, an airlift strategy only countered Soviet effectiveness, reducing their probability of success but not by itself making acquiescence any more beneficial. To encourage the Soviets to end the blockade, the Allies had to either increase the benefits of acquiescence or change the frame itself by inducing the Soviets to accept the partition of Berlin as the reference point and measure gains and losses anew. In many respects, the economic counter-blockade made acquiescence more beneficial, while the airlift's success induced the Soviets to reset their reference point and accept the de facto partition of Germany and Berlin. Overall, both the rational and prospect theory models provide adequate explanations, but only the prospect theory model seems to offer that countering the Soviet blockade with airlift might change the way they perceived the larger problem.

Iraq in 1990-91 offers three different coercion problems: whether Iraq could have been deterred from invading Kuwait; whether from August to January economic sanctions, military preparations and diplomacy could have succeeded in coercing Iraq to leave Kuwait; and finally, whether Saddam Hussein was coerced during Desert Storm

[16] See Shokair, pp. 38-39, and Donovan, pp. 194-195.

and by what primary means.[17] If we focus on the latter two periods, Saddam Hussein was in the domain of losses and had two possible frames. One possible frame was a realist view, weighing relative national military-industrial positions: Iraq was not respected but possessed military capabilities, was in a steadily deteriorating economic situation, and occupied a critical piece of territory. Saddam's other possible frame was from a domestic politics perspective: the ascendance of an Iraqi empire with himself as the leader. The reference point in this case is that Iraq had little international respect following the Iraq-Iran war of the 1980s, resented its 'rich' neighbors, and possessed territory of historical and economic significance.[18] The difference between frames is the degree of commitment to the territory in question, or how Saddam valued the benefits of resistance.

Iraq's alternatives changed little from August 1990 through the end of Desert Storm. In continuing the occupation of Kuwait, Saddam may have foreseen a probable, though not certain, chance for success in retaining all or part of it. At the same time, Iraq's expectation for favorable negotiations changed little—the United Nations terms remained focused on Iraqi withdrawal, loss of military force, and restoration of Kuwait as a whole. The rational model suggests that increasing economic costs and political isolation—with

[17] Richard Herrmann actually identifies four phases, further dividing the intervening period into Aug-Oct, when economic sanctions and diplomacy were at the fore, and Oct-Jan when diplomacy and military threats were heightened. See *Limits of Coercive Diplomacy*, Chap. 10, pp. 230-231.

[18] In *Deterring or Coercing Opponents in Crisis*, R-4111-JS (Santa Monica: RAND Corporation, 1991) Paul Davis and John Arquilla describe both frames, labeling the military/industrial view Model I and the domestic Model II, their preferred model for explanation. Robert Jervis in *Avoiding Losses/Taking Risks*, p. 30, finds more explanatory power in the Model I or realist view. Finally, Richard Herrmann's piece in *Limits of Coercive Diplomacy* explores both, and seems to favor Model I as the US view of Iraq, while finding that Model II may describe its behavior better.

a military buildup threatening Iraq's ability to hold Kuwait—would eventually force Saddam to acquiesce. US and coalition patience, however, ran out.[19]

Once Desert Storm began, airpower strategies of punishment, decapitation and denial were used in an effort to coerce Iraq. The foremost rational scholar, Robert Pape, proposes that punishment and decapitation accomplished little, and that the denial aspects of the 38-day air campaign succeeded in destroying Iraqi capabilities and thus their expectation for success *before* the land offensive started. He believes that Iraq was willing to withdraw from Kuwait and meet most UN terms before the land war started, and, therefore, Saddam was coerced by denial.[20]

The prospect theory model again shows the complexity of the domain of losses: either potential frame puts Saddam in a position that focuses on eventual payoffs, downplaying probability and favoring risky means. If Saddam possessed the imperial frame, he might be even more risk seeking, as negotiating territory away might be inconsistent with Iraq's "manifest destiny."[21] From August 1990 to January 1991, the deployment and airlift of coalition military forces could only influence Iraqi perceptions of the probability of military success. For decisionmakers in the domain of losses, increasing risk does not by itself change behavior. During Desert Storm, the denial campaign would have similar effects: Iraq presumably still saw some chance for success in potential breakdown of the coalition, and would still favor resistance over the

[19] See Hermann, pp. 244-246.
[20] See Pape, "Limits of Precision-guided Airpower," *Security Studies* 7:2 (Winter 97/98): 111-113. His argument rests on Iraqi approaches to the Russians to negotiate a cease-fire, and an apparent withdrawal of forces from Kuwait before the coalition land campaign began. The latter point has been discredited; see Barry Watts, "Ignoring Reality," *Security Studies* 7:2 (Winter 97/98): 142, 144-146.
[21] Davis and Arquilla describe this view—their Model II—as the more accurate one; see pp. vi-vii.

unfavorable terms of defeat. Once Iraq's forces in Kuwait collapsed, withdrew during the land campaign, and suffered significant losses, Saddam's frame and alternatives changed. Though still in the domain of losses, the benefits inherent in Kuwait, Iraq's "19th province," disappeared, and thus negotiation finally became more attractive: even a collapse in the coalition would not restore Kuwait to Iraqi hands nor stop American destruction of Iraqi forces. Unfortunately, the extent of both the air and ground campaigns make it a matter of semantics whether Iraq was coerced or simply defeated by brute force.

The actual results support the view that Saddam had an imperial frame throughout the period, though not conclusively. If Saddam was a realist interested primarily in relative military/industrial positions, he might have responded before the coalition ground campaign, because it was reasonably clear before that point that his forces had suffered significantly, and withdrawal might split coalition commitment to continued military action, forestalling any invasion. An imperial frame would involve much more commitment to the territory of Kuwait in Iraq's measurement of benefits, and would involve increased distaste for the terms of defeat. But both frames retain validity because it is not clear in any history of the events that Saddam understood the destructiveness of the air campaign to his forces prior to the ground invasion, nor the potential for splitting coalition commitment to further action, and that understanding is what would cause the realist to withdraw before the imperialist.

A review of the domain of losses case presents some difficult hypotheses. Decisionmakers may embark on a course of action that leaves little room for negotiation, continuing that course as long as it offers some small chance at success, in order to avoid

loss. A rational prescription to coerce by decreasing their probability of success is not enough, for a little more risk is not unpalatable in the target state's frame of the situation. Either the probability of winning must be made to appear *very* low through a denial campaign, *with other measures affecting future costs*, so that acquiescence actually averts more loss, or the perceived payoff of resistance—the benefits sought—must change. For the two events shown here, airpower strategies of airlift and denial campaigns, *combined* with economic strategies or punishment threats, appear to have the greatest chance for success.

Table 4. Domain of Losses Coercion

Event	Frame of Adversary	Strategy Of Coercer	Rational Explanation	Prospect Theory Explantion
Berlin Airlift 1948-49	Mil/Ind Position: Loss of control & security	Airlift Punishment	Airlift buys time; other means like counter-blockade raise costs	Airlift buys time; must change terms of defeat or adversary frame
Desert Storm Aug 90-Feb 91	Domestic Cond: Iraqi Great Power Mil/Ind Position: Territory & oil	Airlift (deploy) Decapitate/ Punish/Deny	Sanctions might work with time// Denial best to coerce	Must try to directly affect benefits, or change terms of defeat

Small Probabilities: Trapped in Dire Straits

Few conditions are more desperate than when a country's military strategy faces almost no chance of success, and most coercion theories hypothesize that when this situation is recognized surrender is imminent. Unfortunately, this is not a universal solution—a significant number of wars have continued long past the point of military failure; late in World War II Germany and Japan were nations in dire straits who continued past the point of futility. Germany presents an interesting case for coercion, not because the Allies attempted to coerce Hitler's Reich into early surrender (arguably,

they did not), but rather because Germany fought well past any 'reasonable' point where achieving even limited success—e.g., withdrawing from some or all disputed territories and digging in at home—was possible. The coercion question for these two events is "What were the dynamics in the adversary decisionmaking that favored continuance over surrender when the situation was so dire?"[22]

German military leaders recognized as early as 1943 that defeat was in sight for their nation, and two factors may have influenced the domestic conditions for the decisionmaker framing of Hitler: the simultaneous disaster at Stalingrad and the Allied Casablanca pronouncement demanding unconditional surrender.[23] Unconditional surrender was rightly viewed as total capitulation and a probable end of the German state. Whatever reference point was chosen, that surrender—which defined the acquiescence alternative—was a severe loss, and Hitler may have defined resistance as seeking any situation in which the state and people survived.[24] Most histories present that both the chance of military success and the chance of a (favorable) negotiated peace were, after this point, very unlikely.[25]

While the desired end for the Allies was the defeat of Germany, there were those who felt that strategic bombing—incorporating both punishment and denial strategies of

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[22] This approach needs to be explicit, because each of these WW II cases suffer a flaw when one studies coercion: the opponent actually sought defeat, and used strategies of brute force to disable the adversary, rather than any effort to seek a negotiated solution supported by violent means.

[23] See Anne Armstrong, *Unconditional Surrender* (New Brunswick: Rutgers University Press, 1961), p. 119.

[24] As Pape says in *Bombing To Win*, "senior leaders did not believe that conquest of Germany *itself* had become inevitable." See p. 256.

[25] Gerhard Weinberg points this out and offers a counter argument that Hitler may, in fact, have still had *reasonable* belief in potential victory until late 1944 or early 1945. This would put him in the domain of losses rather than small probabilities, still leading to

airpower—might have brought about an "early" collapse of the German state.[26] According to the rational model, both strategies should have been effective in changing the cost/benefit calculus, though some argue that denial more directly affects an adversary's perception of succeeding with long shot efforts. The massive bombing campaign against Germany, however, fails to show that worsening the cost/benefit ratio changes behavior; even the US Strategic Bombing Survey was forced to conclude that "if they [the German people] had been at liberty to vote themselves out of the war, they would have done so well before the final surrender."[27] Unfortunately, the populace had no apparent means for influencing the decisionmakers or Hitler—and coercion depends on affecting the decisionmaking process.

Prospect theory suggests an alternative calculation: in the domain of small probabilities, decisionmakers will overweight long shots. Hitler and German leadership weighed the very small probability of success, small benefits and future costs of resistance against the terms of unconditional surrender and went for the less severe: continuing the war. As Anne Armstrong relates, "From sheer lack of alternative they continued to fight."[28] Strategic bombing could only be successful in coercing Germany if future costs could be made massive enough that pursuing the long shot was more awful than capitulation. In contrast, the rational model simply argues that costs must outweigh benefits.

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risky behavior—but a different argument. See *Germany, Hitler & World War II* (Cambridge, UK: Cambridge University Press, 1995), pp. 274-286.

[26] Pape, *Bombing To Win*, pp. 258-266.

[27] United States Strategic Bombing Surveys, *Summary Volume, European and Pacific Wars* (Maxwell AFB: Air University Press, October 1987), p. 12.

[28] Armstrong, p. 134.

In terms of coercion, the bombing and ground campaigns continued until the Soviets and other Allies were literally knocking at the door of Berlin. Whether one considers surrender at that point pure defeat, or minimal coercion, prospect theory suggests that perhaps future costs had finally been judged to be close to or overwhelming those of unconditional surrender. German beliefs about Soviet intentions would support this view,[29] but the timing of Hitler's suicide weakens arguments that Germany was only waiting for a favorable position between the Allied armies. It may be that the change in decisionmakers was the only means for triggering the desired decision by the adversary.

It is worth noting that an argument that Hitler was irrational in his decisionmaking challenges explanations by both rational and prospect theory models. If, for instance, there is no reason to believe the Ardennes offensive in December 1944 held *any* prospects of military victory, then Hitler chose an option with *zero* probability, rather than small probability. How can any model predict or explain such behavior? While the rational model would be confounded by this argument, prospect theory says the behavior is understandable as long as there is any belief in a chance of victory, no matter how small. Thus as long as Hitler or any decisionmaker in dire straits thought an effort might split the Allies or cause collapse of the US determination to fight, it is consistent with prospect theory for that option to be chosen over acquiescence and surrender.[30]

Japan's situation paralleled that of Germany in many ways. Despite the worsening and almost hopeless military situation facing her in 1945, Japan continued the war as the

[29] Some postulate that German decisionmakers wanted as many Germans out of Soviet control as possible, and that they were willing to endure continued fighting to allow German retreats and western Allied advances. See Armstrong, p. 139, and Pape, pp. 287-289.

[30] Gerhard Weinberg argues that Hitler believed the Ardennes offensive could cause collapse on the American home front. See *Germany, Hitler, and World War II*, p. 285.

Allies approached an invasion of the home islands. Her frame centered more on domestic political conditions: cabinet bureaucracy which was dominated by military leaders, and in which the Emperor played a normally passive but authoritative role.[31] As in Germany, the reference point chosen by the cabinet rejected capitulation as dishonorable, and Tokyo sought any means which would preserve the state. Resisting offered the small hope of protecting the home islands from invasion and preserving Japanese institutions, if not also the semblance of control in Manchuria.[32] American military strategies included an unrestricted submarine campaign, and a strategic bombing campaign characterized primarily by punishment but also by denial; the dropping of the atomic bombs on 6 and 9 August formed the capstone effort.

Any rational choice explanation of events in this case is fraught with competing factors and contradictions. Two critical influences for Japan beyond the American military strategies were the entry of the Soviet Union into the war and the possible change in surrender terms by the US.[33] The classic view of Japanese decisionmaking is that US strategic bombing—both conventional and atomic—brought the full message of future costs to the Japanese leadership, and sped Tokyo toward surrender.[34] But revisionist views also hold that the further destruction of military capabilities did not influence Japan's military leadership; a change in behavior came more from the change

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[31] For a description, see Barton Bernstein, "Compelling Japan's Surrender," Journal of Strategic Studies 18:2 (June 1995): 101-148, and Ernest May, *'Lessons' of the Past*, pp. 129, 134-137.

[32] Bernstein, pp. 118, 130-135.

[33] While several writers discuss this, Leon Sigal's contrast of rational choice explanations with a list of competing factors is the best written on this problem. See *Fighting to a Finish* (Ithaca: Cornell University Press, 1988), p. 13.

[34] This accords with the USSBS, which includes the counterfactual that surrender would have come within a month, and more surely by years end, even without the atomic bombs. See Barton Bernstein, pp.101-2.

in surrender terms, and Soviet entry in the war.[35] Robert Pape even advances the view that the submarine campaign was the most significant element, reducing the probability of success for the Japanese to the extent that the atomic bombs, at most, speeded a decision that they had lost the war.[36]

The prospect theory model again leads to the realm of small probabilities: the Japanese would consistently favor long shot chances to avoid loss. Only US atomic bombing presented such terrible costs to the Emperor and some advisors that even the long shot was more awful than surrender. Regardless of some military leaders' penchant for honor and belief that they could defeat the US on the shores of Japan, the future costs exceeded the humiliation of capitulation. In terms of the timing of cabinet actions, Soviet entry into the war threatened Japan with the loss of territory and finished hopes that Moscow might help negotiate a better surrender, while the very slight admission by the Allies that the Emperor might be allowed to continue in some form promised a change in terms. While prospect theory does not answer the 'single important factor' question better than any rational approach, it does put more context on what influence each factor might have had in the decisionmaking process.

The case of dire straits suggests two observations for coercive policy. First, if the focus of adversary decisionmaking is taking the long shot to avoid loss, then efforts at denial may be non-productive (for coercion), and one may instead need to turn to changing payoffs through punishment or offering better terms. Resistance needs to be not merely futile, but more terrible than surrender. Second, it can be extremely difficult to coerce an adversary into complete subjugation: how can resistance be made to appear

[35] Bernstein, pp. 128-137.
[36] Pape, *Bombing to Win*, pp. 126-127.

more costly? Because of this, it appears that in similar cases of dire straits it may be profitable to aim at changing the adversary's frame: in Japan, military action set the stage for a change in political leadership, while other factors changed the nature of surrender and acquiescence. In the modern world, the coercer may find that making resistance more terrible is politically infeasible, so that changing decisionmakers and frames is the only coercive strategy with any chance for success.

Table 5. Small Probabilities Coercion

Event	Frame of Adversary	Strategy Of Coercer	Rational Explanation	Prospect Theory Explanation
Germany 1945	Domestic Conditions: No chance of success, nor negotiation	Punishment Denial	Denial leads to military defeat; punishment does not work	Denial will not change dynamic; need very large costs, or change negotiation
Japan 1945	Domestic Conditions: Military defeat, bombing, capitulation	Punishment Denial	Denial by interdiction leads to military defeat; bombs speed process	Denial not direct part of surrender decision; bombs raise future costs; other factors change frame

Summary

The utility of a theory rests to some degree in its explanatory power. The prospect model theory, to be useful, must show some advantages over a rational model of coercion, or its additional information requirements become liabilities. Historical cases in which coercion is used against adversaries who are in the domain of gains, domain of losses, or realm of small probabilities are therefore important in showing the difference that a bounded rationality model can make.

The cases of Vietnam and Bosnia are in the domain of gains, and prospect theory provides greater insights into how the coercive strategy influenced decisions at the time

they were made. North Vietnam was coerced into allowing a US exit rather than ending Hanoi's pursuit of a unified nation, and the Bosnian Serbs and Yugoslavia were coerced into solidifying their gains at the negotiating table rather than giving up their goals entirely. The cases of the Berlin Airlift and Iraq in Desert Storm are in the domain of losses, and prospect theory shows a stronger ability to explain the adversary's behavior than a rational model does. The Soviets only responded when airlift countered their strategy and the Allied economic embargo offered a tacit inducement to lifting the blockade; similarly, Iraq only sued for peace when resistance no longer had any potential for gains, and surrender offered some conservation of power. Finally, the cases of two Axis Powers in World War II serve as studies in the realm of small probabilities, and show some more stark differences between the models. A rational model only offers that punishment seems to have little impact in these cases, but prospect theory suggests that punishment can play a role in foreclosing last-ditch strategies. The next chapter explores the implications of these propositions.

Chapter 6

Conclusions

> *Emphasis on the purely coercive role of air and space power [measured in terms of destructive power] runs directly counter to its merits … campaign planning based on the idea of coercion through pain infliction may undermine one's ability to employ modern air and space power in ways that effectively exploit its capabilities to control the battlespace, shape adversary behavior, and bring the conflict to a more rapid conclusion.*
>
> —Daniel Goure and Stephen Cambone

This thesis offers the proposition that air power's coercive effects can be better understood with a prospect theory framework than with a rational actor model. Coercion is a national-level strategy—a use of power to achieve objectives—that focuses not on imposing the desired conditions upon adversaries, but rather influencing their *decisionmaking* towards accepting and implementing those conditions as a negotiated solution to a confrontation.[1] The foundation of coercion is the adversary's decisionmaking process, and most theories of coercion rely on a rational model that weighs costs, benefits, and expectations for success and sees military force and airpower

[1] The epigram speaks to this and is owed to Daniel Goure and Stephen Cambone, "The Coming of Age of Air and Space Power," *Air and Space Power in the New Millenium*, (Washington, D.C.: The Center for Strategic & International Studies, 1997), p. 35. Unfortunately the authors carry their concept forward into a contradictory and illogical argument by saying "The measure of effectiveness for a future joint campaign centered around air and space power is the attainment of goals irrespective of decisions made by the adversary." This denies any usefulness whatsoever to coercion, which as this paper makes clear, is wholly dependent on adversary decisionmaking concerns.

as influencing those costs and expectations directly. Prospect theory presents a different model that may better explain decisionmaking and the effects or linkages of airpower to coercion.

Practitioners of air power and national decisionmakers should incorporate several facets of a prospect theory model of airpower coercion into future planning and strategy. First, the developed model displays a mechanism for coercion in which airpower destruction to raise the adversary's costs is only one possible role among many. Second, a comparison of rational and prospect theory models across past coercion events reveals the added value of considering framing and alternatives. Finally, the model suggests some tools that strategists should use in the future.

What the Model Reveals

The prospect theory model of coercion expands dramatically on its more rational predecessors. Most of the classic models depend upon airpower to deliver increased costs to the adversary's cost/benefit analyses; some more recent models, such as Robert Pape's, emphasize that airpower may more effectively influence expectations of both benefits and costs. But the prospect theory model first defines the *decision mechanism*—choices of continuing and acquiescing, and a frame that specifies how the choices are valued—then explains an evaluation step that includes risk calculations and weighting of uncertainty. A generalized model can show the contrast between these two approaches:

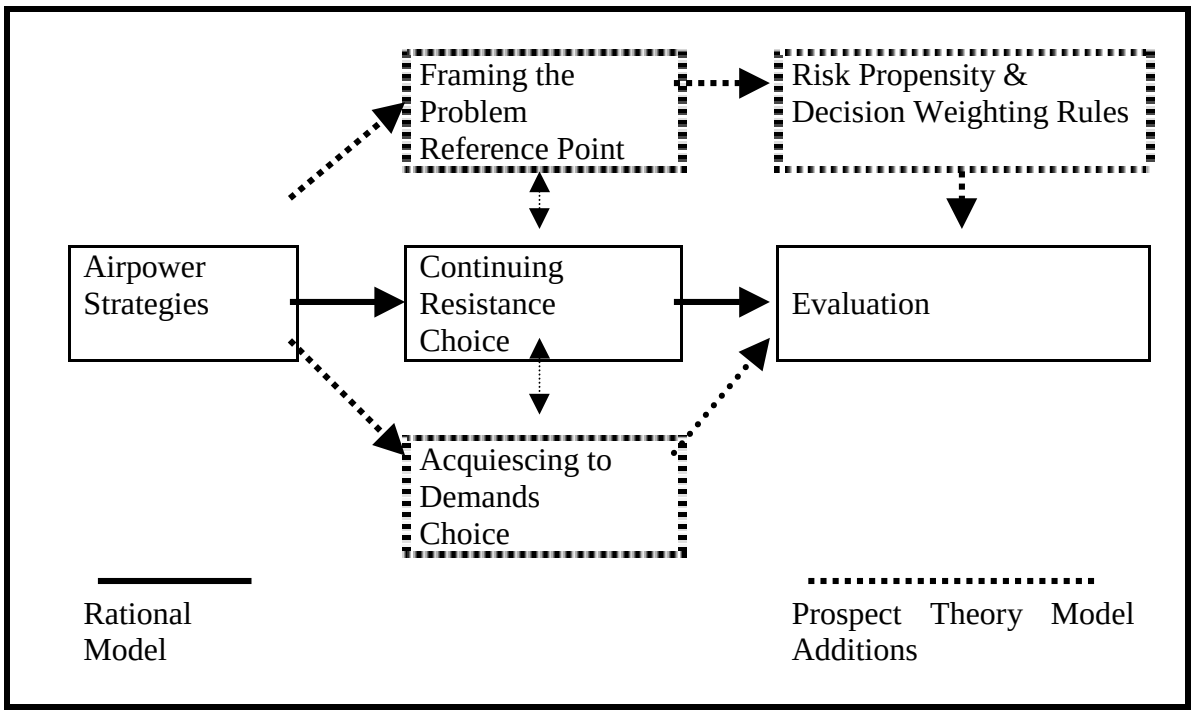

Figure 5. The Contrast of Decision Models

What we find with the prospect theory model is that an adversary's framing of the problem is critical to understanding their behavior. Decisionmakers have in mind a comfort zone or *reference point*—the position they want to have or exceed when all is said and done—and alternatives are constantly weighed against this reference point. When the adversary's current status is below the reference point, they are much more risk acceptant, and denial strategies are less effective because they tend only to increase risk. When the status quo is at or above the reference point, the adversary is more conservative, and denial strategies are important in encouraging them to seek more certain gains in negotiation. Finally, when an adversary sees itself in a loss situation with very low expectations for successful resistance or successful negotiation, it may pursue apparently futile strategies in the hopes of miraculous recovery. Coercers may have to

seek a change in decisionmakers or make the futile operations more terrible than capitulation.

There is considerable appeal to the expanded model. We know, for instance, that decisionmakers do not consider a choice in isolation; rather, choices are made between alternatives. Intuitively, we also know that in some situations people will take risks, and other times behave conservatively, and thus the idea that there are risk and decision 'rules' or tendencies is reasonable. Airpower in the expanded prospect model is multi-faceted, and this lends credibility to the notion that air power is flexible and provides more than singular effects. Finally, decisionmaker behavior consistently shows that how one views or perceives a problem contributes directly to preferences for alternatives, and thus framing makes sense as a concept.

Thus, the first conclusion of this paper is that coercion's dependence on the decisionmaking mechanism of the adversary requires a more robust model than has often been used in the past. Prospect theory offers a more rigorous model that, for individual decisionmaking under risk, has shown consistency in explaining and predicting choice. But despite the model's contribution to expanding *theoretical* thoughts on coercion, the next question is, "how useful is it?"

What the Past Reveals

The first measure of usefulness of theory is how well it explains something, and prospect theory shows some added value in examining past coercion. Surveying a number of coercion events where adversaries were in different decision frames produced a number of insights. The cases of Vietnam and Bosnia are in the domain of gains, and show decisionmakers seeking more certainty in the perceived outcomes. Denial

strategies were very useful here, though there appears to be an interdependence with making the negotiating terms more appealing. The cases of the Soviets in the Berlin Airlift and Iraq in Desert Storm are in the domain of losses, and show that the decisionmaker frame is critical—each adversary took a risk in the first place because it perceived the alternative as a loss. Denial in these cases did not help as much as rational theory predicts, and additional actions seemed to influence a change in frame. Finally, the cases of the Axis Powers in World War II serve as studies in the realm of small probabilities, and show that nations pursuing apparently futile strategies may need to have the benefits of surrender strengthened or reiterated, in addition to increasing the apparent costs of resistance and decreasing the adversary's ability to resist. Denial works here only if the expected probability of success can be made *zero*, rather than merely smaller. In fact, the best coercive strategy when one faces an adversary pursuing futile hopes may be that which attempts to *change the decisionmaker*, either physically or by influencing their framing of the problem.

Table 6. Insights from Prospect Theory

	Domain of Gains	Domain of Losses	Small Probabilities
Framing	Focus is Probability…seek more certainty	Focus is Payoffs… seek better position	Focus is severity in payoffs…avoid sure loss
Alternatives	Definition of Acquiescence is critical to influencing adversary	How to make Continuing more costly than the loss they were already avoiding is central issue	Adversary may view Acquiescence as utterly unacceptable and *unchangeable*
Air Strategies	Denial and Decapitation may be most useful…but, some attention to terms of defeat facilitates success	Denial by itself may only *increase intransigence*; use any strategy that may help shift frame to status quo … possibly airlift	Punishment may be the means to clarify which alternative is worse, or may help *change the decisionmakers*

Cases	Vietnam, 1965-67, 1972 Bosnia, 1995	Berlin Airlift, 1948-49 Iraq, 1990-91	Germany, Japan 1945

Another insight from this survey is important for strategists: there is no panacea strategy within coercion. Denial often plays a role in success, but in the domain of losses in particular it can create some false assumptions and make coercion more difficult. Punishment strategies remain viable, too; in the realm of small probabilities, they may be the most effective military means for inducing a change in behavior.[2] The merger of air power strategy and prospect theory is also consistent with Clausewitzian thought—the role of politics and diplomacy is nearly inseparable from military action in coercion. The acquiescence alternative plays a shadow role in the rational model, but prospect theory highlights that terms of defeat often serve as the foundation for adversary choice—and negotiation rarely lies in the military realm.

The survey is not intended as a 'proof' but as an exploration, and there are some challenges worth considering. First, the rational model is simpler and easier to use than a prospect model, and in some cases its predictions are not substantially different. In particular, it seems that if the rational model were modified to also consider alternatives, it would often lead to similar conclusions about the limits of air power strategies. It would still have some problems dealing with risk, and most importantly framing: framing is counter-rational because it asserts that 'outside' considerations, to include individual perspectives, can lead to changes in preference without changes in the actual situation. But the rational model remains valuable for its parsimony.

[2] In fact, there remains the separate concept of *reprisals* which argues for punishment strategy, too.

A second challenge encompasses some shortcomings of prospect theory itself. The theory originated to explain *individual* decisionmaking under risk, and often coercion events involve *group* decision mechanisms, for example, governments. Attributing a single frame to a group of people may be inconsistent with the very notion of framing, while merging or aggregating frames is an unexplored area for researchers.[3] A second problem with the theory is interaction: coercion is, at its simplest, a two-player game. Robert Jervis points out that "the fact that both sides can have different reference points" may lead to situations where both are avoiding loss…and both perceive negotiating any change as additional loss.[4] These are suggested areas for future research, but an additional area is even more important: a theory of framing. This paper suggests a method for deriving adversary frames that may bear further research, because determining the coercion target's frame is crucial. As Jack Levy argues,

> A knowledge of the actor's reference point is absolutely essential for any empirical application of prospect theory, however, and the absence of a theory of framing is the single most serious limitation of prospect theory and the most important task for future research.[5]

The third challenge leads to the next section, and deals again with utility: just how should strategists and leaders use this model in the future? In other words, are there practical tools and recommendations that prospect theory suggests, as well as academic insights?

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[3] See in particular Eldar Shafir, "Prospect Theory and Political Analysis," *Avoiding Losses/Taking Risks*, Barbara Farnham, ed. (Ann Arbor: University of Michigan Press, 1994), pp. 149-150.

[4] See Robert Jervis, "Political Implications of Loss Aversion," *Avoiding Losses/Taking Risks*, p. 33.

[5] Jack Levy, "Loss Aversion, Framing and Bargaining," *International Political Science Review* 17:2 (April 1996): 186.

Tools for the Future

Both the prospect theory model and the insights derived from it can be incorporated into planning and strategy tools. While the model developed and presented in this thesis is very theoretical, it suggests that there are information requirements, adversary tendencies or courses of action, and recommended strategies for influence, that can be applied to individual and organizational tools and methods. The key is to identify the most powerful facets of the model.

For individual strategists, the best tool may be a method of breaking down coercion problems. Rather than approaching strategy problems in this area as "what targets do I need to strike to achieve what effects,"[6] strategists should capture the whole picture. This entails a recognition that airpower does not just affect an adversary's calculations about resistance, but that the adversary has certain values attached to a reference point or comfort zone, and that the adversary must choose between alternatives. This suggests three questions for any coercion problem:

What is the adversary's framing of the problem?

—Does their Military/Industrial position, or domestic politics, give an idea of a comfort zone or desired end state?

—How do they value territory, lives, political rights?

What are the components of their two alternatives?

—What are the benefits, costs, and probability of success of *continuing*?

—What are the terms of defeat, expectation of negotiation, and offered inducements for *acquiescing*?

What airpower strategies can influence the frame and alternatives?

—Will the adversary favor risk or conservatism?

—What parts of the alternatives will I need diplomatic/political help with?

Along with these questions one may consider two 'rules of thumb':

a) Actors perceive themselves to be in the domain of losses more often than we would normally expect. Often the best measure is the adversary political leader's explicit statements on the confrontation.[7]

b) Most cases show that if coercion has already been attempted, then subsequent attempts will require efforts to change both alternatives, or the frame, to achieve success.

The prospect theory model of coercion also offers some prescriptions for organizational planning. As this study has shown, framing or finding the adversary reference point is central to the process, and may be the best measure for determining both the appropriate force strategy and the level of diplomatic efforts required. Organizational processes may be the best approach to forming estimates of adversary framing. Paul Davis and John Arquilla, in applying prospect theory to crisis decisionmaking and past cases, suggest two components: 1) tasking regional specialists to present the players, ideas, factors and possibilities but not specific predictions nor a

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[6] See Robert Pape's discussion in *Bombing to Win* (Ithaca: Cornell University Press, 1996), pp. 56-58, as one representation of this tendency to reduce strategy to a targets-effects spectrum.

[7] Levy makes this valuable point; see "Prospect Theory and International Relations," *Avoiding Losses/Taking Risks*, p. 127.

single 'frame';[8] and 2) establishing procedures that emphasize developing more than one estimate or framing of the adversary.[9]

But the greatest organizational tool may be that of doctrine, and it may also be the greatest challenge. Inherent to the airpower coercion model presented is the idea that force is applied to influence the adversary's decisionmaking, not, ultimately, to reduce the adversary's military capabilities. The argument that a denial strategy of airpower is no panacea for coercion directly suggests that a military organized and trained to disable the adversary may not be organized and trained to influence the adversary. Coercion requires the ability for nuanced use of force: the ability to coordinate military action with diplomatic messages, and, when necessary, restrain the use of force. Doctrine may need to recognize a dual use of force requiring distinctly different methods and priorities.

Final Word

Coercion is one of the most challenging problems the US Air Force faces today, because it is the more likely task of a smaller, technological military force than is military compellance or victory over enemies. But the record of military coercion is mixed, and more often than not scholars use hindsight and history to point out how decisionmakers did not understand their adversaries. While this observation certainly has merit, one hypothesis of this paper must be that perhaps decisionmakers have applied too rational a model in executing coercive strategies, and that it is time to refine our methods and thinking in this area.

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[8] Paul Davis and John Arquilla, *Thinking about Opponent Behavior* (Santa Monica: RAND Corporation, 1991), p. 21.

[9] Davis and Arquilla suggest this in *Deterring or Coercing Opponents in Crisis* (Santa Monica: RAND Corporation, 1991), p. 78; they recognize there are difficulties with a

Prospect theory offers a compelling model for coercion, one that is robust in its definitions and yet usable by strategists and leaders. It provides a broader and intuitively appealing perspective of the problem, one that demands we consider the alternatives the adversary faces when we ask him to give up a course of action. Additionally, it incorporates the concept of risk, and thereby attempts to account for the variety of risk-taking and conservative behavior we see in conflicts throughout history. Understanding how coercion works requires no more than a merger of air power and prospect theory, and that has been the objective of this thesis.

'devil's advocate' approach and suggest this go beyond that, not forming competing models as much as alternatives to judge effectiveness and vulnerabilities of strategy.

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